NOV 7 194

FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

NEEDED: A FOOD ADMINISTRATOR ... MUCH MUST BE DONE QUICKLY

(SEE PAGE 37)

NOVEMBER 1942

Engineering of Tunnel Dehydraters

Meat Dehydration Procedure for Small Plants

Simple Tests Control Blanching

Effects of Army Feeding on Foods

Conversion May Keep Plants Going

Preview of the Chemical Show

A McGRAW-HILL PUBLICATION

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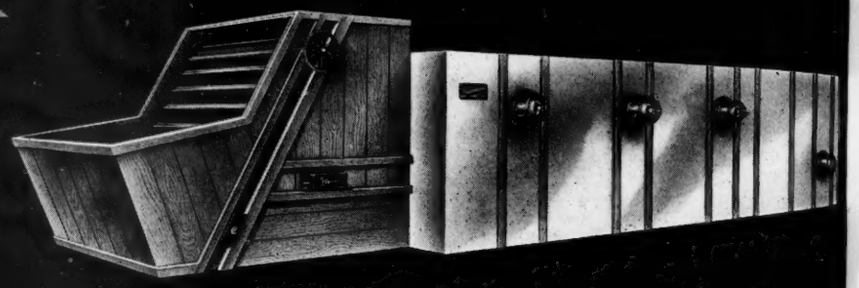

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THE COVER

Why is beside the point. But up to now the government has not taken the steps that must be taken to guarantee supplies of foods in the quantities and in the forms required to feed the armed forces and civilians of the United States, and at the same time keep our allies marching on adequately full stomachs. There is much to be done to guarantee the needed food supply, and it must be done quickly if it is to do any good. To get it done requires a Food Administrator with more authority than any of the food agencies in Washington now have. The urgency of this problem is discussed in an editorial on page 37.

FOOD INDUSTRIES

M. A. WILLIAMSON, *Publisher* — LAURENCE V. BURTON, *Editor*

E. S. STATELER, *Associate Editor, Chicago* — G. L. MONTGOMERY, *Associate Editor*

F. K. LAWLER, *Managing Editor* — ELIZABETH B. SHAW, *Assistant Editor*

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This Issue

Army Foods With a Future

No agency has done more to shape the course of food manufacturing and packaging to fit the needs of the military than has the Subsistence Research Laboratory of the Chicago Quartermaster Depot. And no one in that laboratory knows more about the changes taking place than does Col. R. A. Isker, chief of the laboratory. Which puts the colonel in a position to speak with authority on the effects of Army feeding on foods of the future. What he says about this is reported on page 41. Some of the wartime foods will offer new competition in the domestic market after the war.

Better Make It Essential

There are lean days ahead for those food plants which are neither making essential civilian products nor filling contracts for military and Lease-Lend products. This is true because materials, equipment and manpower will soon be even more scarce than they now are, and they will be allocated to plants producing necessary commodities. If your plant is not now on the essential list, you will do well to convert it, or parts of it. On page 43 are helpful suggestions, right out of official Washington.

Clearing House for Problems

With war needs seriously curtailing ordinary methods of food processing and packaging, and often causing shortages of ordinary food raw materials and ingredients, food manufacturers these days need all the help they can get. Any opportunity to discuss their problems with a considerable group of equipment makers and materials suppliers should be doubly welcome.

That is what makes the National Chemical Exposition in Chicago, the last week of this month, so important. Every food production man who can get there should not fail to go. But whether he does or not, he should read the "preview" of this shown on page 44.

More About Dehydration

Most vegetables are today being dehydrated in tunnel dryers. And many operators of dehydration plants know little about the engineering fundamentals upon which the operation of these dehydraters depends. Which makes W. B. Van Arsdel's second article on tunnel dehydraters (see page 47) one that should not be missed. The author is chief chemical engineer of the government's Western Regional Research Laboratory and an authority on his subject.

Coming

Notes From a Circle Tour

L. V. Burton, editor of Food Industries, has just completed a swing around the country, in which he has visited many important dehydration plants from New York to San Francisco.

First fruit of his travels will be an article, in the December Food Industries, describing the equipment and operation of a potato dehydration plant in Idaho. Other articles will appear in succeeding issues.

Don't Forget the Big Blaze

So much has been said about fighting fire bombs that one is apt to overlook the obvious fact that there are two parts to a fire-bomb blaze. There is the burning bomb itself and then there's the outlying fire which starts from the bomb and spreads with a speed proportional to the combustibility of the burning material and the inefficiency of the fire-fighting methods. There is a technic for handling the two-part fire, and your workers should be trained in it. This technic will be described in an early issue by William H. Easton of the Safety Research Institute.

New Sweetener From Apples

New sugar sources continue to be developed. Next month we give you apples.

It has long been known that apple sirup is sweet, but it certainly has had a marked flavor and a limited use. Research has taken out the flavor, color and stickiness, leaving a very sweet, bland sirup that can be used in ice cream and candies, and may even be used in icing our cakes. It can be made from otherwise unmarketable apples, so we can still have applie pie, too.

Laboratory work is continuing, but there will be engineering details and a flow sheet in the December issue of Food Industries.

An Unfilled Need

Low-sugar jellies are new products for which a demand already exists—such as fruit salad and jellied consomme that will remain firm at room temperature, wine jellies that are not too sweet, and aspics ready to use. To make these new and needed products, modified pectins are now available which will produce jellying at a low sugar content. How the pectins are modified, and what can and cannot be done with modified pectins, will be told in an early issue by Aksel G. Olsen, director of the food technology section of the research and development department of General Foods.

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor NOVEMBER, 1942

Needed: A Food Administrator —Much Must Be Done, Quickly

SINCE the creation of the Food Requirements Committee in July, those whose task it is to feed the people of the United States have awaited action by this committee. Up to now so little has been accomplished that it is obvious that something else must be done. It is plain that this nation cannot afford to wait any longer for action. A real food administration is needed before it becomes too late.

Why the Food Requirements Committee has failed to do all that ought to be done is beside the point. The composition of its membership may have been wrong. Its organization or its place within the WPB organization may have been wrong. It may have lacked the driving power of a sincere conviction that there is a real job, an enormous job, to be done. Or it may have been unable to cope with the opposing forces of the Army and Navy, as has been previously pointed out to be one of the major obstacles to a coordinated and comprehensive national food plan. The latter arises from the competition of the armed forces for the available scarce materials and manpower, and generals and admirals are hard eggs—hard drivers—they are not chosen because of their willingness to self-sacrifice. It is, therefore, entirely possible that the genial farmer from Indiana, who is the Secretary of Agriculture and chairman of the FRC, has been worsted in his efforts to secure a proper share of metals and manpower to take adequate care of the vital food supply of the United States and those who depend on us for Lease-Lend food.

It is not necessary to fix the blame here. But it is necessary to demand a setup that will produce results. Plainly we need a food administrator with greater powers, one who is not subject to the pressure of any political bloc, one who will get results, come hell or high water. In brief, we need a Ministry of Food with broad powers.

During the few months that have elapsed since the FRC was created, a new problem has been faced by both the food industry and agriculture alike—the shortage of manpower. Farmers are selling fine dairy herds for slaughter because their farm hands are attracted to munitions plants and shipyards by wages four times as high as farmers can pay. The loss of men to the Army is a lesser problem than the competition of industrial jobs.

The needed Food Administrator must have power, both legal power and personal force, sufficient to insure that our food supplies are not endangered by lack of men on farms or in factories. He must be able to get enough of the critical metals available to insure that the foods are adequately processed, preserved and distributed. He must proceed on the sound basis that what people will eat in 1944 will be determined entirely by what is done in 1943.

Our 1942 crops are harvested. What we shall eat in 1943 is largely settled already and the best food administration imaginable can't do much about it now. Food is seasonal in its production but is consumed every day in the year. We can lay up our cars to save rubber, but our bodies must be fed every day.

Not only must the needed food administrator face all these conditions and problems and bring about a proper solution, he must also have the force and guts to bring all the related agencies into line that are messing into the food problem. In short, the situation has grown so bad that it is now up to the President of the United States to clarify it. It is far beyond the powers of Donald M. Nelson to solve this mess in time to stave off disaster.

A food administrator with well-nigh dictatorial powers is the only answer. While the President is re-forming his war administration he must also tackle the food problem.

L. V. Burton EDITOR

The Talk of the Industry

● Food shortages are now beginning to show up, the shortage idea now becoming official with the OPA ruling to cut down on civilian meat consumption. It must be that cargo ship launchings are overtaking sinkings.

For those who enjoy forecasts of bad news, we hazard the opinion that the number of Allied cargo ships afloat will determine the shortage of foods in the United States.

● Newest goal of research in the food industries is a pigmy sockeye salmon. The fish are needed to test a model of a stream gate at the University of Washington. Immature fish, though small enough, will not do, for they have not yet developed the instinct to swim upstream.

So scientists of the International Pacific Salmon Fisheries Commission seek a dwarf fish, which when adult is not over two inches long. When that research is finished, there will be no longer any guess work as to how to dam streams without interfering with the salmon supply.

● Banker management for food plants has been deplored in these columns in the past, but perhaps it won't be feared in the future. At least, not if more bankers follow the lead of some in an up-State New York town.

The local food packing plant, being caught short of help at the height of the season, enlisted all the big shots of the town to chip in and work on a short night shift. The bankers, several lawyers and even the undertaker found out, at first hand, what makes a food plant tick.

● OPA price ceilings have made it rather difficult for the Army and Agricultural Marketing Administration to buy the food products they need by limitations imposed on selling prices. In many areas the efforts of OPA to squeeze the processor have resulted in reluctance of processors to bid on business that is bound to show a loss. Parity and ceilings have been getting too close.

Verily, the change from a free, or reasonably free, economy to a managed economy is filled with headaches and difficulties.

● Stabilizing costs by freezing wages, salaries and farm prices under the new law was inevitable if there is to be any real effort to prevent inflationary price rises. Why the move comes so late is to be answered by political wiseacres. Stabilization will be wonderful if it works. But one is skeptical. If the move were made without equivocation or mental reservation it would appear that certain other laws should have been repealed, and certain government bodies should have been eliminated.

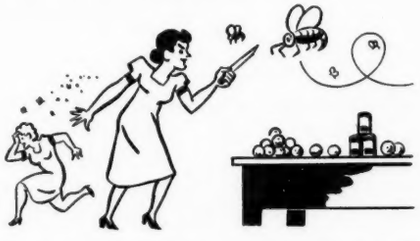
● Curiosity is aroused by a table appearing on page 134 of the September 15, 1942, number of *The Chemurgic Digest*. Purporting to give the consumption of castor oil in various industries for the year 1941, it credits the shortening industry with the consumption of 888,733,000 lb., the oleomargarine industry with 149,991,000 lb. and the other edible products production with 311,569,000 lb. We knew castor oil was a good industrial lubricant, but never dreamed it greased the ways so thoroughly in the food field.

● If there was any person in Seattle, Tacoma, Portland or San Francisco who did not know all about the recent inspection trip of President Roosevelt he must have been deaf, dumb and blind. Arriving in Seattle the day he had been there, we were informed of it three times before getting a room. Censorship, indeed!

● Hardly a day goes by but what Food Industries is asked to suggest substitutes for materials that have become scarce or impossible to obtain. We like to oblige and do so whenever the information is available. But some of these requests have us stumped. The latest unanswerable inquiry comes from a reader in Canada, who desires a formula for a cuttlebone substitute. Can any kind friend oblige?

● Occupation of the remainder of Madagascar by the British promises possible relief to food industry users of flavorings and spices. Largest world producer of vanilla and a large producer of cloves, this great island is also a source of other flavoring materials. With good fortune, some of these will reach our ports as ballast in returning supply ships.

● Hazards of food production are highlighted by a report from our correspondent in British Columbia, who reports that bees caused a cannery in Oliver, B. C., to change from daylight operation to a night shift.



Discovering the sirup in which peaches were being packed, tens of thousands of bees swarmed into the plant to get a free lunch. After nine girls had been stung, the others refused to work. So the plant had to shut down until the bees went home.

Here in the States, canneries must be screened to keep flies out. This will keep bees out too—so maybe our Canadian friends should also use screens.

Heinz To Distribute Raisins

Much excitement developed in California over the announcement that H. J. Heinz Co. will handle all domestic sales of raisins packed by Sun-Maid Raisin Growers Association of Fresno, Calif. Here is one way of keeping a big sales force busy even though restrictions and limitation orders by WPB may cut down the volume of goods that can be produced.

You Have a Date With a Junk Man

To keep our steel industry at victory speed requires huge quantities of scrap metal, most of which must come from industrial plants—much of it from food plants. Rubber, copper and

other scarce materials are needed, too.

The need for steel scrap is real, and most urgent. Agencies all over the country are putting forth special efforts to get in the scrap. They wouldn't if there weren't good reason. The government is even sending 3,000 field men—borrowed from industry—into the nation's factories to help management find the scrap and get it out.

Yes, our war industries badly need those old pieces of pipe, that leaky old tank and battered kettle, the worn-out pump and broken steel ladder, those odd pieces of angle iron, steel rods and sheet metal in your junk pile. They need these things and all the other junk you have been saving like string on the odd chance that someday it will come in handy in an emergency. Well, the emergency is here.

But don't stop with the junk pile. Look over your factory and your repair shops for "dormant" scrap—obsolete machinery, tools, equipment, fixtures and what not. If it hasn't been used this season and if someone can't prove it's going to be used next season, find a use for it or scrap it.

Like every other operation in a food plant, scrap collecting must be planned and executed as per a schedule. Good intentions won't kill any Japs. Make someone in your plant responsible for getting in the scrap, establish a policy as to what to scrap, make a search, make a date with the junk man and keep that date.

More Women Should Be Trained

Last call for 1943 replacements for food plant workers will soon be sounded. Now is the time for food processors to begin actively planning to recruit and train, during the winter off-season, those women workers who must be employed to replace the men who are drafted or who go to the shipyards and munition plants. Next spring will be too late, for the competition to hire the remaining available women workers grows keener each month.

Cold Storage Space Needs Efficient Use

War-induced demands for refrigerated warehouse space are the greatest in the history of the food industry, according to the Office of Defense Transportation. Space is expected to be insufficient and operators and users of cold storage, cooler and freezer space should utilize these refrigerated facilities as efficiently as possible.

This condition has been emphasized by the recent crop report, which indicates that the commercial apple crop, always a large user of 30-deg. space, is the largest in years. Add to this the other large fruit and vegetable crops realized this year, plus the unusual need to store meat, poultry, and fish in freezer space, and the reasons for the "pinch" are evident.

To make the best use of the available space, concentration of holdings should be avoided. Rather, they should be distributed as widely as possible with relation to their point of use by production plants or consumers. This is true, except in the case of fresh apples, other fresh fruits and fresh vegetables which are best held as near as possible to the producing areas and shipped out only in sufficient quantity to meet current requirements.

It will take careful planning and coordinated action by the food industries to avoid spoilage and waste of perishable foods during this period of insufficient cold storage space.

Need for Packaging Standards

Packers of dehydrated foods will do well to get together on packaging standards, particularly on net weights. Confusion in buyers' minds is bound to occur if variable net weights are found for a given size of container.

Take the 5-gal. can as an example. Some makers of dehydrated potatoes fill with 11 lb. 9 oz. Others go as high as 17 lb. 8 oz., while still others fill at intermediate weights.

It is not our purpose here to say why this condition exists, but merely to point out that each container costs about 30 cents, delivered. The firm that fills to the lower net weight must

Hors d'Oeuvres

• *Borden's "Milky Way" tells of a midwestern milkman who has a horse trained to stop at the house of each customer on the route and a pet monkey trained to carry the milk to the doorstep. The milkman goes along for the ride.*

• About that idea for putting a ball inside of a beverage bottle to act as a check-valve closure.—A midwestern bottler writes that this was tried years ago. It didn't work because the empties weren't returned. Kids broke the bottles to use the balls for marbles. Is there no end to food industry problems?

• *This little item appeared in "News of Norway." "There is a story going the rounds in Norway that a German soldier was gored by a bull; in reprisal, the Germans lined up 10 cows and shot them dead."*

• A dairy farmer at Yaphank, N. Y., finds that soft dreamy music from a radio in the cowbarn increases the milk production of his Holsteins.—Maybe there is something to that "contented" slogan after all!

• *It is rumored that sardine canners are going to revolutionize their packing departments by putting them under the direction of hotel clerks from Washington, D. C.*

• In wartime our plenty plows under the Axis. But in depressions our government plows under plenty.

• *They've made a game of nutrition. It's called Vita-min-go. How far each player goes is determined by how many vitamins he consumed that day. If you best your offspring one day, he can win the next by eating more of the foods you've been wanting him to eat. Clever people, these nutritionists.*

• Major Seversky in his book, "Victory through Air Power," estimates that the English might be fed entirely by 100 planes daily carrying dehydrated foods. In a sense this is "victory through hot-air power," dehydration being done principally by hot air.

• *As a way of using the surplus of planes after the war it has been suggested that foods be strato-frosted. You would load a converted bomber with fresh spinach in California, fly directly to New York at an altitude of 28,000 ft., where the temperature is 45 below, and land at La Guardia Field with five tons of quick-frozen spinach. That's putting postwar planning on a high plane, to say the least.*

• Canned ham and eggs is the latest wartime food creation. But it could have been worse. Dehydrated ham and eggs is quite within the realm of possibility.

• *Castor oil has been placed under complete control by WPB. A case of regulating the regulator.*

• National Dairy Products Corp. has discovered that a rubber-like substance which might be used for recapping tires can be made from dairy products. By the time the war is over we shall know which side our Buick is buttered on.

F.K.L.

use three containers, approximately, where the firm filling to the higher net weight uses but two, for the same quantity of product.

Furthermore, what comparison will the buyer make between two bids? And what useful purpose is served by all the air in the can?

Substitutes Must Taste Good

Now that meat is in short supply and about to be rationed, a drive is getting under way to promote the use of vegetable proteins from soybeans and peanuts, as substitutes. Research has been instituted in various government agencies to develop foods containing these proteins for both military and civilian use.

This is a promising endeavor and should result in considerable additional supplies of nourishing foods for home use and for our allies. But a word of caution is in order. These new foods must taste good if they are to be successfully introduced. Peanut flour and soybean flour are developed to the point where general acceptance can be expected, and soybean meal as a filler for sausage and other meat products finds ready acceptance. But too many of the vegetable protein products that have sought a market in the past taste like anything else you can mention except good food.

Experienced food manufacturers never lose sight of the importance of pleasing, attractive flavors for their products. The government agencies responsible for promoting these new foods should keep this experience firmly in mind, or their endeavors will meet with little success. Anyone with memories of 1918 will recall how soldiers react to unpalatable food, and there is little doubt that civilians will react likewise.

Labor Critical Now —What of Next Year?

That the help situation is acute in Western States is at once apparent to anyone who makes a tour of food processing establishments. Many a plant that heretofore has been as orderly as a naval warcraft is now barely able to operate with the help available. Up to now plant sanitation has been maintained, but tidying the premises has been neglected, a condition that has grown acute in most seasonally operated businesses.

What 1943 holds in store is contemplated with shudders by managements with long memories that recall 1917-1918. The pessimists fear that they will not be able to operate at more than half capacity in the coming year. The despondents predict food shortages arising from anticipated labor shortages, a condition that will be greatly aggravated by losses of key men from operating forces.

The times demand the utmost in resourcefulness and wise planning for the coming year. But all the management brains in the world cannot replace technical supervisory men when green help is employed. Unless the Selective Service Law is modified, something very serious will happen to the United States food supply.

Preservative Effect of Acetic Acid

Acetic acid in the form of vinegar has a definite preservative effect that is more dependent on the acetate radical than on the pH produced. According to Dr. Charles S. Ash of San Francisco, the preservative effect of 0.75 percent of acetic acid is approximately the equivalent of 0.1 percent of sodium benzoate.

In the days to come, when every trick or device of food preservation must be utilized, this relationship should be kept in mind. It is well to remember, however, that sodium benzoate is effective only in acid solutions; in neutral foods its effect is insufficient to preserve.

Keep Up the Daily Tasting Tests

Newcomers in the business of preservation of food by dehydration must learn many a step that is commonplace routine among those who have been in business for years. One of these is the daily testing of products by tasting. This is on the *must* list of every food manufacturer with experience. It should be instituted by every newcomer just as soon as he gets his plant into operation.

Daily tests of yesterday's production should be compared with stored samples held for three and six months. If you do not know what your product tastes like, freshly made and after several months of storage, you are depriving yourself of vital information. To leave the taste verdict to buyers is equivalent to a restaurant owner going out to eat.

Start those daily tasting tests now, keep them going as long as you are in business. And keep a record of the results. If perchance you don't like the taste of your own foods, there is nobody but yourself to apply the remedy—well, nobody but the sheriff.

Reasons for Army Packaging Requirements

"When in Rome, Shoot Roman Candles" goes an old saying. When you are selling to the Army, it is wise to comply with Army requirements. If you argue, you are likely to waste a lot of breath and finally do what the Army wants anyhow. Or else, no dice.

This comment is prompted by the extreme reluctance of some food manufacturers to comply with what the Quartermaster asks for. Have you ever been to New Guinea, Tulagi, Guadalcanal, Leopoldville, Eritrea, the Rat Islands or the Aleutians? Have you ever studied packaging requirements for foods in those far-away places? Then who are you to argue that Army packaging specifications are absurd, or too good?

The business of war is quite different from ordinary commerce. In the latter it is often considered smart continually to reduce packaging specifications until damage claims exceed the amounts saved by reducing the cost of packaging from the last set of specifications. In warfare the dollar economy is not paramount. You don't grab a smaller gun when the enemy is about to get you merely because the ammunition costs less.

Army packaging specifications are based on the most extreme requirements, not on average requirements. When a big order is placed for food there is no foretelling whether it is to be shipped to a domestic Army camp or to any one of a hundred foreign bases. The food must be packaged to meet any and all conditions, hot, cold, dry or damp. The Quartermaster has plenty of problems of supply without the problems of unsuitable packages.

What is smart in a profit-and-loss economy is not smart in a life-and-death economy. If you can't or won't comply with Army needs, the thing to do is to step aside in favor of someone who will and can.

ARMY FEEDING WILL AFFECT FOODS OF THE FUTURE*

By COL. R. A. ISKER
Chief, Subsistence Research Laboratory,
Chicago Quartermaster Depot, Chicago, Ill.

As their part in the war effort, food processors are developing new foods to meet special requirements, and they are expanding production capacity for certain products. The new foods and new production capacity will have an effect on the postwar food market

ALL of the members of this organization, if they have time to think back, are surprised at the changes they have made in the past year. Many of you have speeded up production to meet the demands of the armed forces, others have converted their plants to furnish essential materials. Canning plants are turning out dehydrated products, chemical plants are producing dehydrated soups. A confectioner's machine shop is manufacturing gun parts. This is proof of what industry can and will do when the nation is in danger.

A radio commentator made the statement that "industry is scraping the bottom of the kettle." I cannot agree with this. Our industries has always done more than anyone ever expected and are often surprised themselves when they step back and survey their accomplishments.

Within the next year you will be called upon to produce more than ever under increasing difficulties. Trained help will be called into the Army and strategic materials will be increasingly difficult to get. In spite of this, production will continue on the increase. A firm in Chicago built four assembly lines for the "K" ration out of scrap and nonstrategic material. This has no doubt been duplicated in many cases.

I would like to cite one incident where industry came up to bat and made a home run. Our laboratory was cooperating with a firm in the development of a special breakfast cereal for one of the overseas rations. The cereal was approved by the Subsistence Branch of the Quartermaster General's Office at the same time that a large purchase of the special ration was being made. I called the firm and asked what production we could expect. The reply was "10,000 packages a day." "That's not enough, we need 100,000 a day." An hour later I received a call from the firm saying, "Give us 5 days and we will deliver 100,000 packages a day."

We have faith in industry, as many of you know when we call upon you for the impossible. You have faith in yourself and your organization, or you would not be able to produce the impossible.

The Determining Factors

As we test rations in the various parts of the country and under various climatic conditions, we find it necessary to develop new products to meet special situations, and the determining factors for the changes are as follows: Climatic conditions; results of blood, urine and perspiration analysis; service conditions; acceptability by soldier.

For extremely cold climates, a product must be low in moisture so that it will not freeze. Cheese with 35 to 40 percent moisture will be as hard as a brick, and then salt seems to accumulate on the surface, making it entirely too salty for consumption. The answer to this is dehydrated cheese. Dehydrated products, because of their low moisture content, solve many storage problems in cold climates.

Dehydrated products are also very acceptable in hot climates, with a few exceptions. Dehydrated eggs and whole milk do not have as long a storage life because of fat and protein breakdown. Some dried fruits will discolor badly, even when packed under vacuum.

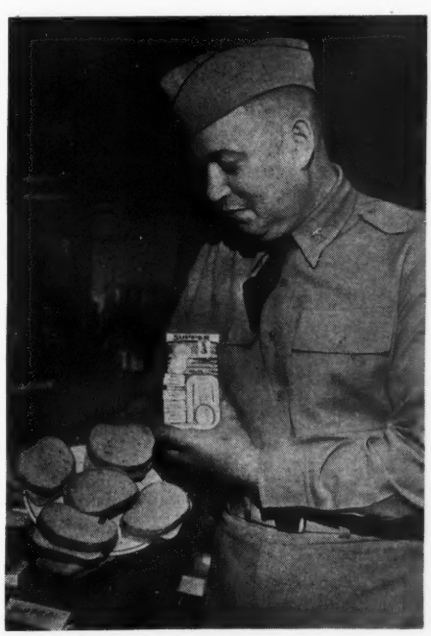
Rations for the desert under extreme heat conditions should contain more salt than the ordinary rations. Salt tablets are available to the soldier at all times and should be taken, but you cannot be sure that the soldier takes them.

Blood Tests Made

During our tests last August the temperature varied from about 80 deg. F. at night to as high as 120 deg. F. during the day. Butter taken from the refrigerator and placed on the table was drawn butter by the time we sat down to eat. It was usually served with a spoon. A product especially prepared for such conditions is the Army Spread, which will not oil off at 120 deg. F. and will not melt on account of the milk solids it contains. It is a 100 percent dairy product containing mostly butter.

During our tests, blood, urine and perspiration specimens are taken and analyzed for chlorine, sugar and B and C vitamins. If the chlorine is low, more salt must be added. The blood sugar should be held at an even keel to keep the soldier from getting nervous and jittery. Indications are that a considerable amount of the B vitamins is lost through perspiration, and possibly some vitamin C. With this information at hand we must adjust our rations to take care of the losses.

The ration must be suited to service conditions. During actual combat the



Col. R. A. Isker comparing five meat sandwiches with the concentrated food of the "Para-ration" pack.

* From a talk before the Sales Executive Club in New York, September 29, 1942.

soldier will not have time to prepare a meal. The K ration is consumed under these conditions and only parts of a meal used as the soldier gets an opportunity to take a bite. For that reason all the components are individually wrapped. Members of a tank crew or troops in rear of the front lines in reserve may have an opportunity to prepare a simple meal. This ration may be very similar to the field ration B, but made up of items that are easily and quickly prepared. Breakfast cereals that require only hot water, instant rice, canned meats and precooked dehydrated vegetables are used in this ration. These products must be packaged to withstand the most adverse storage conditions.

Dehydrated whole eggs and whole milk are two products that have been given a wartime impetus and that will affect the food situation of the future.

Acceptability by the soldier is of great importance. No matter how nutritive the food is, if the soldier will not eat it, it's of no value. Many people have the idea that we can starve a soldier into eating anything. When necessary he will eat almost anything to keep body and soul together, but that does not keep a man in top fighting condition. During our tests each soldier is given a card daily on which he checks the items that are good, fair or poor and whether he wants more or less. There is also a space on the card for remarks. These reports from Private Jones and Private Smith have been a great help in preparing rations that are acceptable to the soldier.

The products prepared for these rations are not always new, but sometimes are old products in a new form. That new form may mean concentration, dehydration, compression, new combinations or prepared mixes to facilitate utilization.

What does our laboratory look for in evaluating new food products that are submitted? Some of the general considerations are:

1. Does the product represent an economy of weight and cubic displacement?
2. If natural vitamins were present in the original material, have they been retained through processing?
3. Does the product smell, taste, look and feel right?
4. Can the product be prepared for consumption with a minimum of effort?
5. Will the product be affected by extreme temperature variations—minus 40 deg. F. to 130 deg. F.
6. Is this product hygroscopic?
7. How long a shelf life will the product have under severe storage conditions?
8. Is the product nutritionally adequate?
9. Is the product of such a nature that it will enjoy a reasonably large percentage of consumer acceptance?
10. Are all the constituents of the product available in the continental limits of the United States?
11. Can the product be prepared on a production basis by more than one or two firms?
12. What type of packaging does the product require?

Many samples submitted will meet these requirements after adjustments are made. Others can be eliminated at once. This means a lot of eliminating, selecting and improving with respect to hundreds of samples that pass through the laboratory. As a result of this weeding-out process, it would appear that food products finding acceptance should not have too much difficulty in securing approval of the public after the war.

Products With A Future

Some of the products we believe will continue in production after the war are:

1. Boneless frozen meat, where you have a saving of 30 to 35 percent in weight and 65 to 70 percent in space.
2. Canned ham and eggs, just coming off the production lines. A product very easy to prepare when your wife joins the WAAC's and you have to cook your own breakfast.
3. Dried skim milk that has all the nutritive value of whole milk except the fat.
4. Progress is being made on a dried whole milk that will keep without packaging in a can and that reconstitutes readily.
5. Army Spread should be a good item for use in hot climates and for export.
6. Dehydrated, compressed cheese that requires only the addition of hot water and a little mixing.
7. A stabilized cream, 20 to 30 percent butter fat. This has no cooked flavor and requires no refrigeration; it holds up indefinitely.
8. Dehydrated apple nuggets, jams and preserves that require only the addition of water.
9. An interesting product submitted to the laboratory, and now being purchased, is the traditional Army baked bean—dehydrated.
10. Many excellent dehydrated soups are on the market and large quantities are being supplied to the armed forces.

In the cereal field we have a breakfast cereal that contains the sugar, milk solids and precooked cereals and may be added to either hot or cold water and is immediately ready for serving. Another cereal of commercial interest is Instant Rice, which is precooked and dried and requires just a few minutes of heating to be ready for serving.

Beverages are an important food component for civilian and Army use. One of the most popular preparations is synthetic lemon-juice powder so concentrated that 12 oz. of this powder plus 5 lb. of sugar will produce 6 gal. of refreshing lemonade. Another preparation is a precooked cocoa powder that is soluble in either hot or cold water and prepared in less than 15 seconds.

World Will Be Better Fed

Many manufacturers have converted their plants to war needs, and they naturally ask: "What will our prospects be after the war?" I am not an economist, unless you use the definition that an economist is a financier without funds. But I feel certain that the products mentioned and many more will have a ready use in civil life. Our export trade will be developed to a greater extent than ever before. The development of the natural resources of China will raise the income of that nation and offer a tremendous field for our goods. Many of the products considered surplus the last few years will be transported in one form or another to sections of our country and foreign countries where needed. I believe that the world as a whole will be better fed as a result of this war.

Our immediate interest is the winning of this war. Without the full cooperation of industry the war cannot be won. You are the generals of industry, marching arm in arm with the generals of the Army to victory.

CONVERSION WILL KEEP YOUR PLANT OPERATING

America needs all the productive capacity it can muster for war goods and essential civilian commodities. If your factory is not now producing such products, you had better plan to convert, and quickly. There are lean days ahead if you do not

THERE will be war casualties among the nonessential food factories. More shortages of all kinds will beset the industry. There will be shortages of material, both domestic and imported, there will be shortages of containers, there will be shortages of equipment and maintenance items, and there will be shortages of manpower.

You Must Act Quickly

These troubles are not far off. In fact they are only a scant 60 to 90 days away. Donald Nelson himself has said that the peak of war production will be reached shortly after the first of the year. He also said that at that time nonessential business will feel the full force of the curtailment program designed to divert the entire national productive capacity to the war effort.

When that time arrives it will be too late to avoid business oblivion that awaits the plants that have not planned in anticipation of the shortages that are sure to come. It is almost too late to do anything about it now, but not quite. Much can be done in three months if the problems are attacked with vigor. But since the problems of every food manufacturer are different, no rule can be laid down to guide the entire industry. Rather must a number of cases be studied in the hope that an applicable idea may be gleaned here and there.

The food industry is fortunate. Small business had to wait until recently for the Smaller War Plants Corp. to be formed to assist in the conversion of the smaller plants to essential manufacture. But for some time the food industry has had the Conversion Section of the Food Branch of WPB to assist in such problems, although no financial assistance is available from that source.

The primary purpose of the Conversion Section is to convert food manufacturers from nonessential production into essential production that will aid the war effort. An attempt is first made to convert them to essential food manufacturing, but that failing other fields are investigated.

This takes time, particularly if it is necessary to go outside of the food field. The first move is to find what the food manufacturer would like to do and try to help in that direction. But the usual procedure is to find where there is a bottleneck in the production of military items and then try to arrange a subcontract and get whatever equipment is necessary.

The next thing is to pry a subcontract out of the prime contractor, who naturally is reluctant to give up any part of his business even though he may have orders enough to keep his plant on three shifts for the next two years. Then the machinery has to be found and installed and the personnel trained. All of this takes time and time is short.

How Some Converted

A conversion along the lines described has been undertaken at the New England Confectionery Co. Here there was a large air-conditioned space and a quantity of skilled help. These were two of the essentials for the manufacture of radio condensers, a much needed item. Machinery and a considerable amount of engineering skill also were required, but these could be secured and were provided. The manufacture of the condensers is now underway and if successful will be tried in other plants.

But, fortunately, the problems are not all as complicated as that of Necco. In many plants, provision must be made to overcome only a partial curtailment of production. This calls for investigation to find something that can be added to the line. The Crackerjack Co. has solved its problem by the use of its regular equipment to package egg powder. Other food companies have done the same.

Some food processors have been converted to more essential lines of food, as were two mushroom canners near Kennet Square, Pa. The problem with both plants was to get containers. When Conservation Order M-81 restricted operations on their regular line, these plants were converted to can tomatoes and asparagus. The additional equipment that had to be provided either was built in the company repair shop or purchased second hand.

Some food manufacturers have been converted to entirely different methods of processing. The dog food industry can be cited as an example. Vaughn Packing Co., Long Branch, N. J., is dehydrating rutabagas, while J. M. Julian Co., a dog food canner in California, is just getting its dehydration plant into operation.

Help for Would-be Dehydrators

When a manufacturer wants to get into the dehydrating business, the procedure is a little different from that described. The Conversion Section will help by directing him to the right people, will assist the manufacturer in preparing his case for presentation, and will act as a "friend in court." The Dehydrated Food Section of the Food Branch has the program of its particular part of the industry well in hand and takes care of recommendations for the high priority ratings that are necessary to get material for new plants and equipment. The Conversion Section acts only in an advisory capacity for the manufacturer that wants to get into the dehydrating business.

Some people have been hunting for new foods to pack. As a result of such investigations, menhaden, a herring-like fish, is now being canned. The menhaden was formerly valued primarily for vitamin oil and animal food. The Conversion Section borrowed some research men from the canning companies and, working with the government Fish and Wild Life people, developed a process to can this fish for human consumption. Great Britain has agreed to purchase 100,000 cases and a plant to be operated by Stokely Bros. & Co. is ready for the first run. The menhaden are handled just like pilchards in California. Next year, when two more plants are to be operating, the pack will be of considerable proportions. A plant superintendent from California Packing Co. will help set up these plants.

Examples of the way the Conversion Section has given assistance should include Reed Candy Co., where airplane

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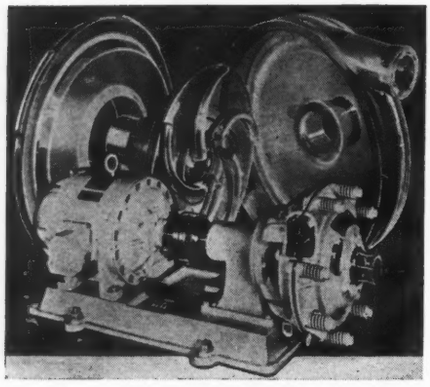
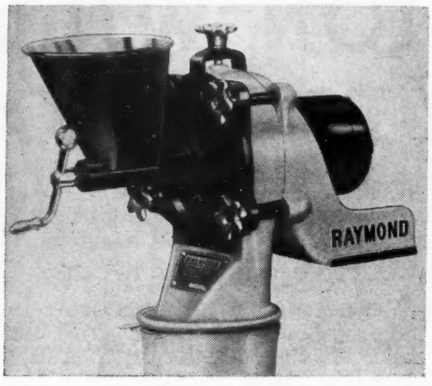
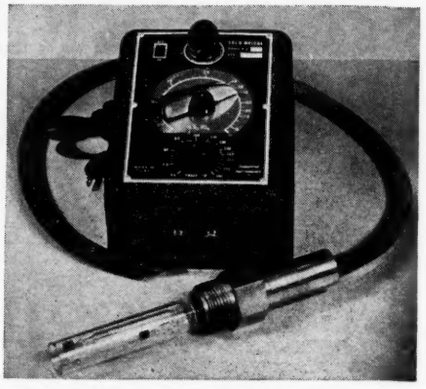


Nash Engineering Co.'s centrifugal pump with volute, backplate and impeller made of "Pyrex" glass.



Laboratory pulverizing mill made by Raymond Pulverizer Div., Combustion Engineering Co., equipped for quick cleaning.



"Solu-Bridge," made by Industrial Instruments, Inc., for testing the acidity or alkalinity of liquids such as washing solutions.

FOOD TOPICS TO HIGHLIGHT CHEMICAL SHOW

Exhibits of equipment and materials useful to food processors, and conferences on food, nutrition and paper packaging materials make this exposition and meeting a must event for all food men who can attend

NATIONAL Industrial Chemical Conference and National Chemical Exposition, to be held in Chicago, November 24 to 29, will exhibit much equipment and materials useful in food processing and will stress food and nutrition of one conference session (November 27th), and paper and plastic materials at another.

Wartime restrictions and shortages make the Chemical Show and Conference in Chicago this year of unusual importance to food production men and technologists, particularly as there will likely be no show and conference in New York in 1943, the U. S. Army having preempted the exhibition space. Consequently, it appears that this year's gathering will offer the last opportunity for some time for food processors to have a general get-together with those makers of chemical engineering equipment and materials who supply so many of their plant needs.

The Chicago gathering is a relatively new one, scheduled to occur on alternate years with the well-established New York affair. But already it has made a place for itself, serving Mid-Western States from which many cannot conveniently get to New York.

It is important that all food technologists who can do so, attend this exposition. Not only will many of the developments of the last year be shown and discussed, but the exposition affords a convenient opportunity to take up one's baffling problems with those who may be easily able to solve them. This is unusually important this year, when new equipment is difficult to get and many substitute materials must be used.

Unfortunately, many who would profit by attending this gathering will be unable to do so. To help these get what benefit they can from the occasion, FOOD INDUSTRIES lists on the next several pages those exhibitors whose names were available at the time of going to press. Also, where the information was available, a brief description is given of the products that will be shown.

Directory of Exhibits at the Chemical Exposition

Wm. Ainsworth & Sons,
2151 Lawrence St., Denver, Colo.

Analytical balances for research and control work, featuring the "Micro Balance" for high accuracy.

Alloy Products Corp.,
221 Madison St., Waukesha, Wis.

American Instrument Co.,
Silver Spring, Md.

Laboratory instruments and apparatus.

American Resinous Chemicals Corp.,
Peabody, Mass.

Substitutes for natural rubber, latex, shellac and other critical materials, developed from synthetic resins and their emulsions.

Ampco Metals, Inc.,
1745 So. 38th St., Milwaukee, Wis.

Castings of Ampco metal for acid-resistant service.

Armour & Co.,
1355 W. 31st St., Chicago, Ill.

Fatty acids and fatty acid derivatives, in various stages of purity, from commercial to chemically pure. And the various industrial uses of these materials will be explained.

Atlas Powder Co.,
Wilmington, Del.

Bareco Oil Co.,
Tulsa, Okla.

Special waxes, of high-melting-point microcrystalline types, applicable in food packaging because of moisture vapor resistance and flexibility when cold.

Bennett Mfg. Co.,
14,600 Princeton Ave., Chicago, Ill.

Buffalo Foundry & Machine Co.,
Buffalo, N. Y.

Exhibit stressing the facilities of this

company's research and testing plant in assisting manufacturers to develop new processes to meet today's conditions.

The Campbell Co.,
Hammonton, N. J.

The Caulfield "Pipettor," a device to enable the chemist to operate a pipette without using his lips, and giving him clear vision of the operation.

Central Scientific Co.,
1700 Irving Park Road, Chicago, Ill.

Commercial Solvents Corp.,
Terre Haute, Ind.

Corn Products Refining Co.,
17 Battery Place, New York, N. Y.

An exhibit of "alternates and substitutes," showing materials made from corn available to replace materials that are scarce or restricted because of the war, including information on industrial applications of the new materials.

Corning Glass Works,
Corning, N. Y.

Industrial glassware, including piping, pumps and glass fittings and parts; also laboratory glassware, including Lifetime Red Low Actinic, and Alkali Resistant (Boron Free), glassware.

F. M. DeBeers & Associates,
20 No. Wacker Drive, Chicago, Ill.

Fletcher 12-in. heavy-duty pilot-plant centrifugal; American Heat Reclaiming spiral heat exchanger; Croll-Reynolds booster, two-stage steam-jet air pump, and expansion joints; Goslin-Birmingham dewaterer or filter.

Denver Equipment Co.,
1400 Seventeenth St., Denver, Colo.

Denver-Dillon two-decked vibrating screen, also a "Hydro-Classifier." In addition, a display of wheat treated by flotation, as used in making "Staff" bread.

The Dicalite Co.,
520 No. Michigan Ave., Chicago, Ill.

The use of Dicalite materials--filteraids --in the manufacture of sugar, sirups, oils and other food products; also use of this material to partially replace critical materials, as in paper products; samples of products.

The Dorr Co., Inc.,
570 Lexington Ave., New York, N. Y.

The use of Dorr equipment in the salvage and conservation of scarce materials, and in the production of alternate and substitute materials.

E. I. du Pont de Nemours & Co.,
Wilmington, Del.

Neoprene synthetic rubber.

Durametallic Corp.,
2104 Factory St., Kalamazoo, Mich.

Packing and sealing devices for process equipment, including rotary and centrifugal pumps, agitators, pressure vessels and power equipment, featuring "Dura Seal," a rotary mechanical seal that rotates with the shaft.

Chas. Englehard Co.,
Newark, N. J.

Ertel Engineering Corp.,
40 West 48th St., New York, N. Y.

Disk filters for food products, neutral asbestos filter sheets, tanks, pumps, bottle fillers and mixers, featuring a hard rubber filter and a plastic pump for corrosive liquids.

Fansteel Metallurgical Corp.,
2200 Sheridan Road, No. Chicago, Ill.

Flow sheet diagrams of processes using acidproof equipment.

The Filter Paper Co.,
57 E. 24th St., Chicago, Ill.

All grades of filter paper, also filter aids, activated carbon, filter cloths, filter bags, "Vacu-Acid" filters, portable gravity conveyors, and pumps suitable for food liquids.

Fisher Scientific Co.,
711-23 Forbes St., Pittsburgh, Pa.

Laboratory appliances, including the Fisher Electrophotometer and the Fisher Titrimeter, also E&A Tested Purity Reagents.

W. J. Fitzpatrick Co.,
111 No. Canal St., Chicago, Ill.

The Comminuter, for fine grinding.

General Ceramics Co.,
Keasbey, N. J.

Corrosion-proof ceramic processing equipment, as a substitute for equipment made of scarce materials, including pumps, valves, piping and containers.

Glycerine Producers Association,
9 So. Clinton St., Chicago, Ill.

Information concerning WPB restrictions on the sale of glycerine.

Glyco Products Co., Inc.,
320 King St., Brooklyn, N. Y.

Synthetic products available as substitutes for scarce or restricted materials, including edible emulsifying agents to replace imported products, and waxes for paper coating.

Graver Tank & Mfg. Co., Inc.,
East Chicago, Ind.

Remote-control chemical proportioners for water treatment, photographs of water-treating installations and of a variety of industrial applications of this company's equipment.

B. F. Gump Co.,
431 So. Clinton St., Chicago, Ill.

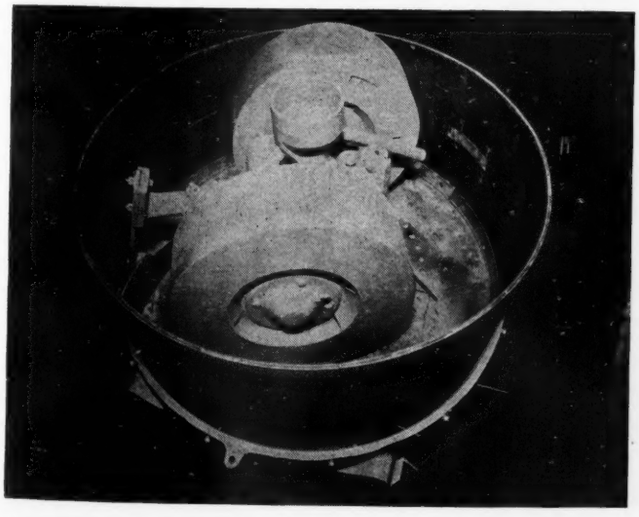
Vibrox barrel packers, Bar-Nun rotary sifters, Draver percentage feeders, Bar-Nun "Auto-Check" weighers, and Edtbauer-Duplex net weighers.

D. W. Haering & Co.,
205 W. Wacker Drive, Chicago, Ill.

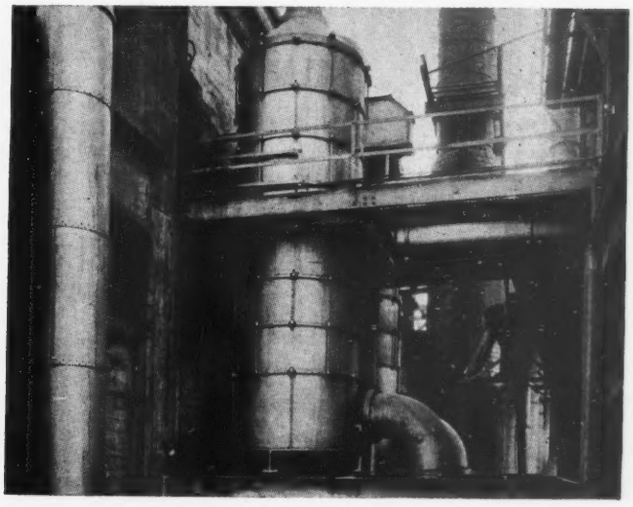
"H-O-H" automatic proportioning feeder for chemicals in water-treating systems, for producing treated, potable water for food processing plants.

Hamilton Mfg. Co.,
Two Rivers, Wis.

Typical items of laboratory furniture, including a storage case assembly with storage drawers in lower section and cupboards in upper section with adjustable shelves and glass doors, also fume hood, work table, sink and titration table.



Looking into a Simpson Intensive mixer, a muller-type of mixing machine made by National Engineering Co.



Dust collector made by Claude P. Schneible Co. and installed at plant of Corn Products Refining Co.

W. A. Hammond Drierite Co.,
Yellow Springs, Ohio.

Indicating Drierite and Regular Drierite dehumidifying products, desiccators, dehydrating units and the Flosdorf-Mudd Cryochem apparatus for dehydration from the frozen state.

Hanovia Chemical & Mfg. Co.,
Newark, N. J.

Quartz mercury-vapor arc lamps as laboratory equipment and as a part of processing equipment where ultraviolet rays are important, including flowing film irradiators, quartz cell irradiators, water sterilizers, also transparent fused quartz ware.

Hardinge Co.,
York, Pa.

Grinding equipment, including rod and ball mills.

Haveg Corp.,
Newark, Del.

Process equipment of reinforced plastic material.

Hercules Powder Co.,
Wilmington, Del.

Displays of products against backgrounds showing their uses, including "Thanite," an insecticide replacing such materials as pyrethrum; resins; plastics; terpene chemicals; synthetics, etc.

Honan-Crane Corp.,
Lebanon, Ind.

K. H. Huppert Co.
152 W. Walton St., Chicago, Ill.

Portable electric furnaces, automatic and manual temperature controls, both laboratory and production models.

Industrial Instruments, Inc.,
156 Culver Ave., Jersey City, N. J.

General-purpose conductivity measuring apparatus for plant and laboratory, including the "Solu-Bridge" and "Solu-Bridge Controller," useful, among other things, for determining concentration of alkali in bottle washers.

Insto-Gas Corp.,
1900 E. Jefferson Ave., Detroit, Mich.

Torches and furnaces, including equipment for soldering and for maintenance work.

Infilco, Inc.,
325 W. 25th Place, Chicago, Ill.

Silica gels, gel catalysts, cation and anion exchangers, and zeolites; also photodiagrams of chemical feeding and proportioning equipment, "Accelator" clarifiers and special water-conditioning equipment.

Johns-Manville Corp.,
22 E. 40th St., New York, N. Y.

"Celite" filter aids in various grades as a means of greater output from present filtering equipment, together with flow charts illustrating applications.

Kewaunee Mfg. Co.,
Adrian, Mich.

"Kemrock," a black stone material resistant to acids and alkalis and to high temperatures, used for laboratory furniture and equipment.

Kimble Glass Co.,
Vineland, N. J.

Laboratory glassware and glass apparatus, featuring bottles and other glass items for blood plasma operations, and a new Brewer culture dish cover for bacteriological work.

Kold-Hold Mfg. Co.,
424 No. Grand Ave., Lansing, Mich.

Refrigeration equipment.

Koppers Co.
Koppers Bldg., Pittsburgh, Pa.

Coal byproducts, chemicals, and processing equipment.

Leader Iron Works,
2110 No. Jasper St., Decatur, Ill.

Photographs of processing equipment including cookers, kettles, heat exchangers, tanks and special equipment of various metals.

Loeb Equipment Supply Co.,
910 No. Marshfield Ave., Chicago, Ill.

Alsop Engineering Co.'s portable electric mixers, filters and fillers for food processing plants.

Lukens Steel Co.,
Coatesville, Pa.

Colored motion pictures showing the fabrication of processing equipment from nickel-clad, Inconel-clad and Monel-clad steels.

Marathon Paper Mills Co.,
Rothschild, Wis.

Paper products.

Merck & Co.,
Rahway, N. J.

Vital role of nutrition in wartime will be featured, also a display of the crystalline structure of individual pure vitamins. In addition, a display of strategic chemicals essential to the war program.

Merco-Nordstrom Valve Co.,
400 Lexington Ave., Pittsburgh, Pa.

Complete line of lubricated plug valves with emphasis on special alloy valves for particular process requirements, also a line of meters for measuring gas, air, oil, water and other fluids.

Morse Magneto Clock Co.,
17 E. 42nd St., New York, N. Y.

National Engineering Co.,
549 W. Washington Blvd., Chicago, Ill.

The Simpson Intensive Mixer, a muller type mixing machine that exerts a kneading action, used for blending ingredients for army chocolate bars, for blending vitamins into flour and for similar operations.

National Technical Laboratories,
820 S. Mission St., South Pasadena, Calif.

Beckman pH instruments, including automatic pH indicators; and Photoelectric Quartz Spectrophotometers for use by manufacturers of vitamins.

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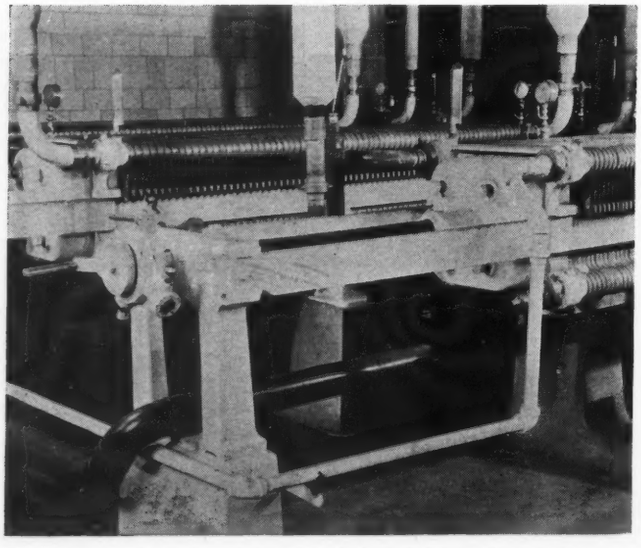
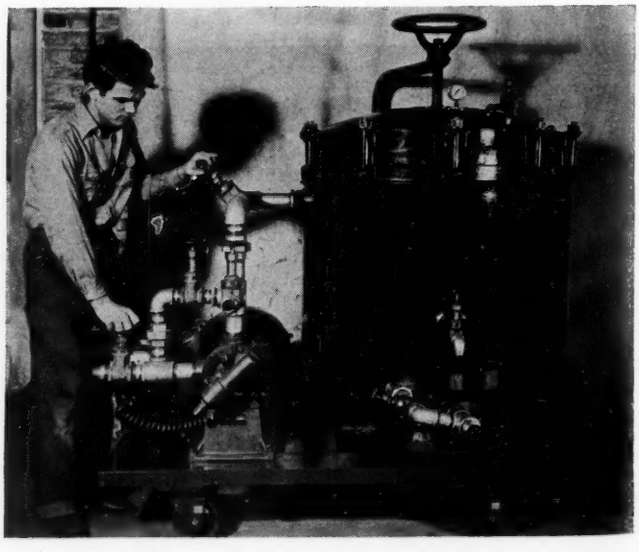


A.P.V. heat exchanger, made by Walker-Wallace, Inc., used as a mash cooler.



Horizontal plate type filter of portable construction, made by Sparkler Mfg. Co.

DEHYDRATED FOODS

Dehydrater Engineering • Tests Reveal Improper Blanching • Procedure for Dehydrating Pork in Small Plants • Standards for Dehydrated Foods

Tunnel Dehydraters And Their Use In Vegetable Dehydration

By W. B. VAN ARSDEL

Principal Chemical Engineer, Chief, Engineering and Development Division, Western Regional Research Laboratory, U. S. Department of Agriculture, Albany, Calif.

PART II*—The physical laws and engineering fundamentals of dehydrater operation, written to guide the plant operator, are given in this section of Mr. Van Arsdel's series. In Part I, factors governing the choice of a dehydrater for vegetables were discussed**

THE first article in this series discussed the factors which should enter into the selection of a dryer for a vegetable dehydration plant, described the situation that favors selection of a continuous tunnel dryer, and sketched briefly the general characteristics of tunnel dryers.

This paper discusses the physical and engineering fundamentals which underlie the operation of a tunnel dryer. It is written to guide the operator of a dryer, rather than its designer. Physical constants will usually be given in easily remembered round numbers. Precision of statement will sometimes be sacrificed to simplicity, for the same reason. The more accurate methods which are required for the design or precise testing of dryers may be found in several of the references in the accompanying bibliography.[5,6,8]

TABLE I—Moisture Content of Common Vegetables Prepared, Ready for Dehydration

Vegetable	Percent moisture	Pounds water per pound bone-dry *T*
Beans, snap	88–91	7.5–10
Beets, table	86–90	6– 9
Beet greens	90–91	9–10
Cabbage	91–94	10–15.5
Carrots	88–91	7.5–10
Celery	92–95	11.5–20
Chard	90–92	9–11.5
Corn, sweet	75–80	3.0–4.0
Garlic	74–78	3.0–3.5
Kale	86–88	6–7.5
Mustard greens	90–93	9–13
Onions	89–92	8–11.5
Peas	78–82	3.5–4.5
Potatoes	78–82	3.5–4.5
Rutabagas	88–91	7.5–10
Spinach	89–93	8–13
Sweet potatoes	67–78	2.0–3.5

Some Definitions and Conventions

Moisture Content. The moisture content of a vegetable, either fresh or dried, is usually expressed by the analyst as percentage by weight. For example, the analysis of a sample of blanched potato strips may be given as 80 percent moisture, meaning that in 100 grams of sample there is 80 grams of water and 20 grams of "bone-dry" matter. Calculations of processes in a dryer are much simpler, however, if the moisture content is expressed on the "dry basis"—that is, as the ratio of water content to dry matter. In the foregoing example this ratio is 4.0. Whenever "moisture-content" is referred to in this article it should be understood in that way. In formulas and equations it is designated by the symbol *T*. Table I lists the approximate values for common vegetables as prepared, ready for drying. The "percent moisture," as ordinarily reported by the analyst, is also given. The convenience of this way of expressing moisture rises from the fact that the weight of dry matter in a given

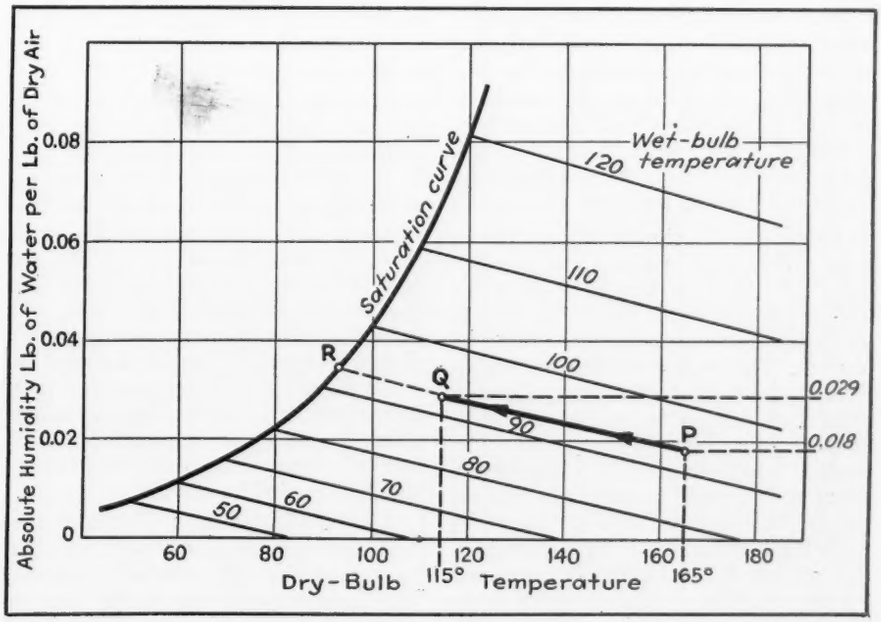


FIG. 6. Absolute humidity chart, showing exact relations of dry-bulb temperature, humidity and wet-bulb temperature.

* Contribution of the Dehydration Committee, Bureau of Agricultural Chemistry and Engineering, Agricultural Research Administration, United States Department of Agriculture.

** Part I of this series of articles appeared in *Food Industries*, October, 1942, page 43.

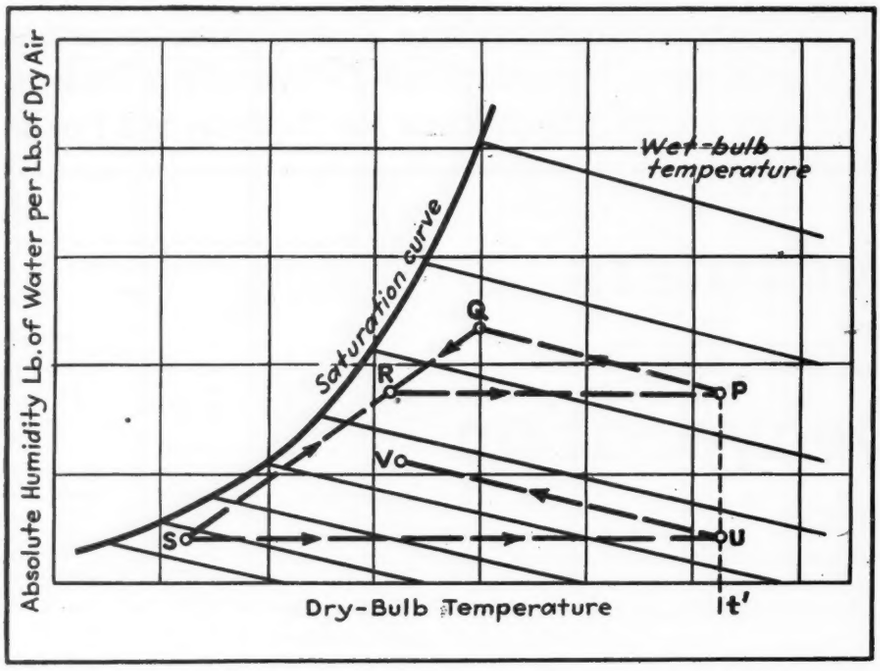


FIG. 7. Effect of recirculation of air in a dehydrater, indicating savings of heat that may be realized by this practice.

piece of vegetable, or on a single tray or truck, remains constant as the piece progresses through the dryer, so that there is a constant base for the calculation. For example, the following important, but somewhat paradoxical, statement may be verified by simple mental calculation:

Most of the water is evaporated while the material is still very wet.

Suppose the material consists of carrot strips, $T = 8$; then 8 lb. of every 9 lb loaded on a tray is water, and 1 lb. is dry matter. When 7 lb., or *seven-eighths*, of the water has been evaporated, 1 lb. of water is left with the same 1 lb. of dry matter—so at that point the material still contains as much as "50 percent moisture" by analysis. About 99.5 percent of the water must be evaporated before the analysis falls to only 5 percent moisture.

Humidity. A similar convention is now widely used in calculating humidities. The absolute humidity of air is the weight of water vapor, in pounds or grains, accompanying one pound of dry air. The reason for the expression is that the weight of dry air, like the weight of dry matter in the vegetable, remains constant through the dryer, no matter what changes in temperature, pressure or humidity take place. The absolute humidity of outdoor air varies with the weather, but a fairly representative average is about 0.008 lb. per pound of dry air. The weight of water vapor carried by a pound of air is always relatively small, even in dehydraters. Absolute humidities in commercial tunnel dryers, run at reasonably high temperatures, range only as high as 0.070 to 0.080, and are usually lower.

At any given air temperature there is a definite maximum humidity corresponding to "saturation" of the air and, the higher the temperature, the higher the absolute humidity at saturation will be. The importance of this to dehydration is obvious—the hotter the air, the more moisture it will hold. A very important consideration, which will be discussed later, is that as the air approaches saturation with water vapor the *rate* at which it will evaporate more water from a wet material falls toward zero.

Wet-bulb Temperature. Everyone is familiar with the fact that evaporation of moisture from a wet object will cool it. If a thermometer bulb is kept moist while dry air is blown over it, the thermometer will read substantially lower than the true temperature of the air, and this phenomenon is the basis of the simplest method of measuring the humidity of air. One or more wet-bulb thermometers are usually installed in a dehydrater for the purpose of both indicating and controlling humidity, either manually or automatically. The wet-bulb temperature is also an index of the heat carried by the air.

The Humidity Chart. The exact relations between air or dry-bulb temperature, humidity and wet-bulb temperature have been plotted in the form of curves. A humidity chart of this kind is very nearly a necessity for the dehydrater operator who wishes to understand what is going on in the equipment. The most useful form is one in which air temperature is measured horizontally and absolute humidity is measured vertically. Fig. 6 represents a portion of a chart of this kind.

Physical Laws of Evaporation

The processes which go on in a dehydrater may be divided for convenience into two groups. Those in the first group may be described accurately on the basis of well-known general physical laws concerning the constancy of mass and heat, and the properties of air and water vapor; they are independent of the kind of material that is being dried. The second group of processes applies specifically to the material, and the only way these processes can be analyzed is through experimental knowledge of the way different materials dry.

Constancy of Mass. Over a period of time, such as a day, the total weight of all materials leaving the dehydrater must be the same as the total weight of all materials entering it. Several kinds of balance sheet may be set up. One of them leads to the common formula for the daily tonnage capacity of a dehydrater.

Tons input per day = 24 × Total drying surface × Loading, lb. per sq. ft. ÷ 2,000 × Holding time, hours

or, using symbols,

$$F = \frac{0.012\,ML_0}{\theta_f} \qquad (1$$

For example, if the total drying surface in the dehydrater at a given time is 8,700 sq. ft. the moist vegetable is loaded at the rate of 1.5 lb. per square foot, and the holding time is 6 hours, then:

$$F = \frac{0.012 \times 8{,}700 \times 1.5}{6} =$$

26.1 tons input per 24 hours

If a similar balance sheet is applied to the *moisture* entering and leaving the tunnel, the change in humidity of the air may be calculated.

Constancy of Heat. Over a period of time the amount of heat which leaves the dehydrater exactly equals the amount which enters. A very important consequence of this fact may be stated as follows:

The wet-bulb temperature of air passing through a well-insulated dehydrater remains constant from one end of the tunnel to the other, if no additional heat is supplied along the way.

Commercial tunnel dehydraters are not perfectly insulated, but in spite of the fact that air temperature may fall as much as 50 deg. F. in passing from one end to the other, the wet-bulb temperature falls only a degree or two. Consequently, the wet-bulb temperature

lines on the humidity chart indicate closely what happens to the air temperature and humidity in a tunnel. If the temperature of air entering the tunnel is 165 deg. F. and its wet-bulb temperature is 93 deg. F., then point *P* represents its position on the humidity chart, Fig. 6. Its absolute humidity is 0.018. At successive points along the tunnel the condition of the air will be closely represented by points along *the same wet-bulb temperature line, PR*, on the chart. For example, if the cool-end air temperature is 115 deg. F., then the humidity there (point *Q* in Fig. 6) will have risen to 0.029. The following general rule is a useful one to remember:

When a pound of air picks up 0.001 lb. of water vapor by evaporation, the air cools about 5 deg. F.

One of the reasons why so much air must flow through a dehydrater now becomes evident. In the example given above where the input is 26.1 tons of vegetables per day, if $T = 8$, about 23 tons of water must be evaporated per day, or 32 lb. per minute. Then if the air falls 50 deg. F. in passing through the tunnel, each pound of air will have picked up only about 0.01 lb. of water, so 3,200 lb. of air per minute must have been circulated. The volume of a pound of air under usual dehydrater conditions is about 16 cu. ft.; the blower must therefore have circulated about 51,000 cu. ft. per minute. If the fall in air temperature is only 25 deg. F. instead of 50 deg. F., but the air flow remains at 3,200 lb. per minute, we know that only half as much water, or 16 lb. per minute, is being evaporated.

Air Temperature Change Proportional to Moisture Change. An important consequence of the foregoing principle is that, in a tunnel dehydrater, the change in air temperature from one point to another along the tunnel is proportional to the change in moisture content of the product between those two points. Then in a section of the tunnel where the moisture content is falling rapidly, air temperature falls markedly within a short distance. The relation may be expressed by the following formula:

$$\Delta t = b \Delta T,$$

where Δt is the change in air temperature between two points along the tunnel, ΔT is the change in moisture content of the product between those two points, and b is a constant under any one set of tunnel conditions. It is equal to

$$\frac{7{,}000\,F}{G\,(T_0 + 1)}$$

where F, as before, is tonnage input per 24 hours, G is the weight of air circulated, in pounds per minute, and T_0 is the moisture content of the wet material entering the dehydrater.*

For example, if the tonnage input $F =$ 26.1 tons per day, original moisture content $T_0 = 8.0$, air-flow $G = 3{,}200$ lb. per minute, then $b = 6.35$; in any section of the tunnel where the moisture content changes by, say, 3.0 units (for example, from 8.0 to 5.0 or from 4.0 to 1.0) the air temperature must fall 3.0×6.35, or 19 deg.

Evaporative Capacity of Dehydrater. When air is saturated with moisture its temperature and its wet-bulb temperature are equal (point *R* in Fig. 6). Saturated air is not capable of doing any further drying. Therefore, the difference between the temperature of air, or dry bulb, and its wet-bulb temperature (the difference is called the "wet-bulb depression") determines the maximum evaporating capacity of the air. Calculation of the maximum evaporating capacity of a dehydrater follows very simply:

Divide the wet-bulb depression of air entering the hot end by 5, multiply by the weight of air circulating per minute, and divide by 1,000.

The answer is the number of pounds of water per minute which can possibly be evaporated in that dehydrater, if no additional heat is introduced along the tunnel.

The actual amount of drying that can be accomplished is a very different matter. That depends upon how tightly the moisture is locked up in the material which is being dried. It cannot exceed this theoretical maximum, but it may be much less.

In practice, it is never safe to approach very close to the theoretical maximum evaporation for two reasons: First, drying becomes very slow as the limit is approached; and second, if the air is too nearly saturated at the cool end, condensation and dripping of water from the walls and roof of the tunnel will occur. It is usual to leave at least 15 deg. of wet bulb depression at the cool end. Then the *practical* maximum evaporative capacity would be calculated from the hot-end wet-bulb depression *minus 15 deg.*

Effect of Recirculation on Humidity. The air leaving the cool end of a commercial vegetable dehydrater of the usual tunnel types is likely to have a temperature of at least 100 deg. F.—sometimes even 120 deg. F. or higher. A very substantial saving in heat may be made by letting only a portion of this air escape and mixing the remainder with the fresh air which is flowing to the heater. This is "recirculation"—one of only three factors which the dehydrater operator can easily control; the other two are hot-end temperature and the rate of charging wet material into the tunnel.

It may seem puzzling that any of this relatively cool, moist air can serve any useful purpose if returned. The fact is that addition of humidity to the circulating air is essential in the dehydration of heavy fruits, and is advantageous, although to a smaller degree, in the dehydration of starchy or sweet vegetables such as potatoes and sweet potatoes. This effect—the avoidance of case-hardening—has already been briefly discussed. Most vegetables may be most rapidly and completely dehydrated with air of low humidity. When that is the case, the sole advantage of recirculation lies in the saving of heat, and this saving will be at least partly offset by slower drying and lower drying capacity.

Study of typical operating conditions discloses that it is possible to recirculate a substantial proportion, say 50 to 75 percent, of the air in commercial tunnel dehydraters, and realize a handsome saving in the cost of heat without serious loss of tunnel capacity. Fig. 7 illustrates these relations on a skeleton humidity chart. Point *S* represents the temperature and humidity of the fresh air. If the temperature designated t' is the desired hot-end temperature of the dehydrater, then point *U* represents the condition of the air entering the hot end; its absolute humidity is the same as that of the fresh air. In passing through the tunnel, its temperature will fall and its humidity will rise, ending up at the cool end of the tunnel at

* The constant 7,000 is only approximate. It is derived from the following operations: 2,000 (lb. per ton) x 5 (deg. per 0.001 humidity change) ÷ 1,440 (minutes per day) x 0.001 (lb. water per 0.001 humidity change).

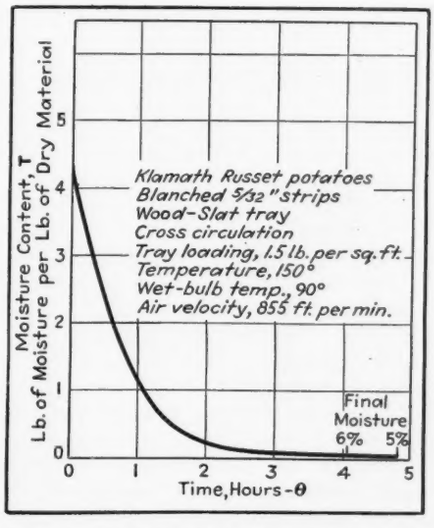


FIG. 8. Experimental drying curve. Note rapid fall in moisture at the beginning of the run and very slow final approach to dryness.

a point on the chart such as V. If there is no recirculation, all of this air will be thrown away, and all fresh air will be heated from *S* to *U*. But if, say, only one-third of the exhaust air is thrown away, and only that difference is made up with fresh air, then humidity rises in the tunnel, and after a short time new steady conditions are set up, represented by points *P*, *Q* and *R* on the chart. The air at the hot end of the tunnel will still be heated to the same temperature as before, *t'*, but its humidity will be higher—point *P*. In passing through the tunnel, its condition will change to point *Q*. The mixture of one-third fresh air and two-thirds exhaust air will be represented by point *R*. The amount of heat required is represented roughly by the length of the line *RP*, which is much shorter than the one representing no recirculation, line *SU*. The increase in wet-bulb temperature and the corresponding decrease in evaporative capacity, however, are only moderate.

Heat Usage in Dehydrater. About 1,100 British thermal units (B.t.u.) of heat is theoretically required to evaporate a pound of water at usual dehydrater temperatures. Considerably more heat than this must always be supplied to a dehydrater, not only because of heat losses through the walls, but also because of the heat which must be thrown away unused in the exhaust air.

Obviously, recirculation will bring about no saving in heat when the fresh-air supply is as warm as the exhaust air from the dehydrater. Recirculation, then, is most advantageous if the fresh-air supply is very cold. Analysis also indicates that a greater advantage is to be gained from recirculation if the temperature drop through the tunnel is low, say 15 to 20 deg. F., than if it is high, say 50 to 60 deg. F.

Operation under a range of conditions which is likely to be met in practice may require from as little as 1,500 to as much as 6,000, or even more, B.t.u. of heat per pound of water evaporated. Even though the cost of heat is one of the minor dehydration costs, such a difference as this is not negligible. If heat costs 50 cents per million B.t.u. delivered to the dehydrater, it represents the difference between 0.6 cent and 2.4 cents per dry pound on a product of moisture content $T_0 = 8$, or the difference between fuel bills of $50 and $200 per day in a 50-ton plant.

The remark made earlier, that recirculation may slow down the drying and decrease the plant capacity, must be emphasized. If capacity does decrease, then the resulting increase in nearly all other operating costs must be balanced against the saving in cost of heat.

Individual Differences in Drying Behavior

The second great group of physical processes which go on in a dehydrater comprises the complex happenings within the moist material and at its surface. These processes are specific to the product and the way it is exposed to the drying air. They are complex and quite imperfectly understood. The only practical way of dealing with them is through experimental determination of *drying rates*.

Measurements of the drying rates of soap, clay, sand, wood pulp and various heavy chemicals have been made by several investigators.[3,5,7] The drying rate of prunes has been carefully studied.[2,4] Little similar work on vegetables has ever been reported.[1] A comprehensive series of measurements on the common vegetables has been in progress since 1941 in the Bureau of Agricultural Chemistry and Engineering, and a report of this work may be expected within the next few months.

Experimental Method. Drying rates are determined in a small batch dehydrater especially designed to assure uniformity of drying conditions and to permit control of temperature, humidity and air velocity over a wide range. The complete investigation of any one vegetable requires many separate complete drying runs, in each of which all conditions are kept constant from beginning to end, and the moisture content of the product on the tray is determined as the run progresses. Temperature, humidity, air velocity, tray loading, shape and size of pieces, even the kind of tray and its placing in the air stream, all are changed one at a time in different runs. In the end, a complete picture of the way that material dries is formed.

A typical single drying curve is shown in Fig. 8. Its most striking characteristics, which are shared by every experimental curve which has been observed, are the very rapid fall in moisture content at the beginning of the run and its very slow final approach to dryness. As a matter of fact, if there is any measureable humidity in the drying air, the product will *never* reach complete "bone-dryness"; instead, it will approach slowly a final *equilibrium moisture content*. The more humid the air, the more moist the product will be at complete equilibrium with the air. Knowledge of the relation of this equilibrium value to air humidity evidently makes it possible to predict the absolute limit of dryness that can be reached in a tunnel dryer. A report of experimental determinations is now being prepared for publication.

Summary of Results. A detailed presentation of the results of experimental drying runs would go far beyond the scope of this article. Some of the major conclusions may be summarized as follows:

1. While there are marked differences in the initial rates of drying of different vegetables, the times required to reach the same final dryness are much more nearly alike. For example, carrots have a moisture content about three times as high as that of sweet potatoes, but they part with the water much more rapidly under the same drying conditions.

2. The greater the surface exposed to the drying air, and the more porous the layer on the tray, the higher will be the drying rate. Thus, riced potatoes dry faster than potato strips, strips faster than slices.

3. If the air is circulated across the trays, the drying rate is highest at very low densities of loading per square foot of tray area.

4. The drying rate increases as the velocity of the air flowing across the tray increases.

5. The higher the temperature and the greater the wet-bulb depression, the faster the drying rate will be, provided case hardening does not result, These two factors must be considered together. For example, drying is faster under temperature conditions of 130—80 deg. F. (temperature first, then wet-bulb temperature) than at 130—100 deg. F., but it will be faster yet at 150–100 deg. F.

6. Total drying time increases very rapidly as the final moisture content is pushed close to its equilibrium value. This factor is frequently the most important one of all. Almost as much time may be consumed in reducing final moisture content from 6 percent to 5 percent or 4 percent, as in bringing it all the way down to 6 percent. When such a condition as this is indicated, there is likely to be good justification for a special finishing dryer which will be supplied with artificially dried air.

The effect of tray loading, air velocity, and temperatures upon tunnel behavior will be analyzed in more detail in the concluding article of this series.

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(Turn to page 103)

Simple Tests Reveal Improper Blanching

By BERNARD E. PROCTOR
Associate Professor of Food Technology,
Massachusetts Institute of Technology, Cambridge, Mass.

Dehydrators of vegetables will welcome these simple quality control tests as a means of checking the adequacy of the blanching process. Control of blanching is a necessity for those who must meet Army specifications, or win consumer acceptance for their products

ONE significant improvement in the processing of dehydrated vegetables, which should make present dehydrated products superior to those of 1918, is the introduction of "blanching." This is a preliminary heat treatment sometimes referred to as a scalding process, occurring before the actual dehydration is started.

It has been found that this preliminary heat treatment slows down the later development of undesirable off-flavors and loss of palatability, which eventually occurs in most dehydrated foods. Therefore, blanching lengthens the storage life of these products. Blanching also lessens color losses or discoloration, in some instances, and reduces vitamin losses in some products. In addition, blanching improves the sanitary quality of most dehydrated products by killing microorganisms. It may also benefit the rehydration process and cut down the time necessary for final cooking of the product.

Blanching has been adopted as part of the processing of dehydrated foods because it inhibits or renders inactive certain chemical components, or enzyme systems naturally present in the tissues of the plant. These continue to function after the raw material is harvested unless inactivated by a heat treatment. In the United States, a steam blanch is usually preferred to the hot water immersion method that is advocated in England.

It is essential, for two reasons, that the producer of dehydrated foods know when these enzymes systems or catalysts have been rendered inactive. First, he then knows that he has done everything possible to insure good storage qualities for his products. Second, he knows that governmental inspection services will conduct tests to determine if blanching was satisfactorily completed.

The tests used to determine the completeness of blanching may be done with relatively simple apparatus and without much experience. Every plant that dehydrates vegetables, except those handling only onions (which are usually not blanched), should have a person on each shift who can run such tests.

Make Tests Immediately

Checking the blanching process by chemical tests immediately after its completion is the only way in which the results of the tests can be of any service. The results must be known before dehydration, or the knowledge will be of no avail. To learn, after dehydration has been carried out, that blanching was incomplete is too late, for it is then impossible to go back and increase the temperature or duration of blanching.

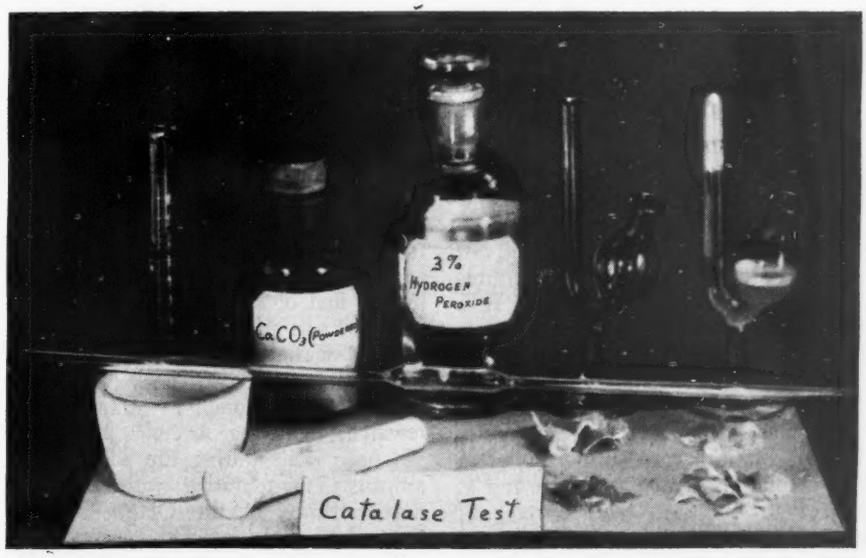
The two most common enzyme tests used for this purpose are the catalase test and the peroxidase test. These two enzymes are not necessarily those that cause all the troubles mentioned. But when these enzymes are put out of action, it may be assumed that any other enzymes that might cause undesirable changes will probably no longer be able to function.

The catalase test is somewhat easier to carry out if done in the simplest manner but, as it requires more severe blanching to inactivate the peroxidase enzymes, the peroxidase tests are considered to be more satisfactory indexes of proper blanching. For carrots, however, the catalase test is considered most reliable.

Catalase Tests

The simplest catalase test is to place a small quantity of vegetable fragments in a glass test tube and add enough 3 percent hydrogen peroxide solution to cover the material to the extent of at least one inch. If no gas is given off within a few minutes, the catalase enzyme is considered to be satisfactorily checked. When a stream of little gas bubbles rises to the surface after the hydrogen peroxide is added, it is evidence that the heat treatment should either be longer or at a higher temperature.

A more accurate catalase test, which enables a better comparison of the amount of gas produced, is carried out by grinding up in a mortar a 1-gram sample of the blanched material, together with an equal weight of clean sand and 0.6 gram of calcium carbonate. This mixture is diluted with 10 milliliters (10 c.c.) of distilled water and



Apparatus used for the catalase test: graduated cylinder, mortar and pestle, pipette, powdered calcium carbonate, 3 percent hydrogen peroxide (without acetanilid), Smith fermentation tubes.

the grinding is then continued for two more minutes. Next, 4 milliliters of this mixture is added to 8 milliliters of hydrogen peroxide in a Smith fermentation tube (see apparatus at right in accompanying photograph). This tube is capable of measuring, in its closed upper end, the quantity of gas that is evolved.[1]

Sometimes a catalase test will be positive even if the products have been thoroughly blanched. For example, the catalase content in the eyes of some potatoes is highly resistant to heat.

Peroxidase Tests

There are two different tests that may be used for the presence of peroxidase enzymes, and which have been advocated to determine the extent of blanching of vegetables before dehydration.

One of these utilizes guiacol, and when this reagent is used the appearance of a red color shows that the blanching was insufficient. The other tests require the use of benzidine, in which case a blue color usually means that the heat treatment should be extended because the enzymes are not yet inactivated.

Both of these color tests may be carried out in white porcelain evaporating dishes, in which the color changes can be readily noted. Ordinary white china saucers will serve equally well.

The guiacol test requires 2 grams of vegetable, which is ground or thoroughly mixed with about 10 milliliters of distilled water. To this mixture add 1 milliliter of alcoholic solution of guiacol (1 percent in ethyl alcohol) and 1 milliliter of dilute hydrogen peroxide (0.3 percent hydrogen peroxide in this instance, made by diluting 1 milliliter of 3 percent hydrogen peroxide with 9 milliliters of distilled water). After shaking this combination, a red color will appear if the product was not blanched long enough.

The benzidine test is completed by mixing 2 grams of ground vegetable with 10 milliliters of distilled water and then adding 1 milliliter of benzidine solution (0.5 percent benzidine in 50 percent ethyl alcohol) and 1 milliliter of 3 percent hydrogen peroxide. If a blue color is produced, it may be evidence that the product was insufficiently blanched. It is known, however, that metallic salts such as iron and copper have the ability to react under similar conditions to bring about a blue coloration, hence a positive test is subject to question. The contact of vegetable tissues with metallic equipment, or the presence of such salts in the product, may cause errors in interpreting the results.

Watch the Hydrogen Peroxide

In all these tests, it is advisable to run a check test with the raw, unblanched vegetable, to indicate the results obtained with the material when it has not been blanched. If positive tests are not obtained on these unblanched vegetables, it means that the hydrogen peroxide is no longer hydrogen peroxide, regardless of the label on the bottle (it may decompose on long standing), or that the hydrogen peroxide used has been stabilized with acetanilid. In the former case, buy a new bottle from the nearest drugstore or supply house. If, however, it contains acetanilid, get some that does not contain this preservative.

In spite of the fact that these quality control tests are not foolproof, they serve as a useful means of checking on the blanching operations.[2] Every dehydration plant should run them regularly, because a slight variation in time or temperature may result in improper blanching and consequent poor products. With dehydration now a major means of food preservation for our Army, any neglect of proper processing, when quality control tests are available, cannot be tolerated.

[1] For specific details of a more quantitative test see paper by R. R. Thompson in *Industrial and Engineering Chemistry*, Analytical Edition, Vol. 14, No. 7, p. 585, July 15, 1942.

[2] For further detailed information concerning tests for this purpose see W. V. Cruess and M. A. Joslyn, *Proceedings of the Institute of Food Technologists*, 1942.

Develops Dehydrating Method for Small Meat Plants

By E. S. STATELER
Associate Editor, "Food Industries," Chicago, Ill.

Any packer with sausage department and smoke house can dehydrate pork by procedure proposed by Griffith Laboratories. Method is now in experimental production stage

GOVERNMENT requirements for dehydrated pork have been estimated at 60,000,000 lb. annually, which raises the question of how this pork is to be dehydrated. Quasi-official reports have it that production will be started by the first of November and that the pork is to be purchased in quantity by the end of the year. To date, no specifications for dehydrated pork have been agreed upon, although a vast amount of research, involving several procedures, has been done during the past several months. The tentative two-step procedure outlined in the October, 1942, issue of FOOD INDUSTRIES (page 49) is only a proposed method. There are others which have not yet been disclosed except to those who are in an official government-industry capacity.

Whether to cure or not to cure before dehydration; whether to add or not to add salt and other condiments during processing; whether to precook or not to precook and, if so, in what manner; and what, if any, fat stabilizer may be used are still points of question. At some time these disputed points are to be settled between technical representatives of the American meat packing industry, the prospective producers; representatives of the Agricultural Marketing Administration, the prospective purchasing agent; and representatives of the British Food Ministry, the prospective wholesale buyer of the finished product.

As one move towards bringing the small meat processors, in addition to the large packers, into the meat dehydrating field, Griffith Laboratories has announced a dehydrating procedure that is suited to the small plant. And this procedure is proposed for use with pork, beef, veal, lamb or mutton. The method was developed by E. L. Griffith and S. L. Komarik.

Like other pork dehydrating procedures, the Griffith process is, as yet, on

an experimental production basis. It is based on the conviction that dehydrated pork containing a small amount of salt and treated with a small amount of "cure" is more palatable and will keep its good eating qualities longer than will the unsalted and uncured dehydrated pork.

Also, the process is represented as being suited to commercial production with the equipment existing in any meat packing plant that has a sausage making department and a smoke house, as well as with systems specifically installed for the dehydrating of beef, pork or other meat products. It is essentially a straight-line production procedure.

The process is further represented as having the advantage of being carried on partially in a number of small plants, where there is a limited quantity of pork available for dehydration, and finished in a large central dehydrating plant operating on a mass-production scale under closer technical control than is likely to be had in small, batch-production plants. In that sense the process is identified as a two-step procedure in which the first step, up to and including curing and precooking, is carried on in numerous small plants. The second step consists in transferring the preliminary processed pork by any feasible means to a central dehydrating plant where it is further processed and packaged for export.

The Method

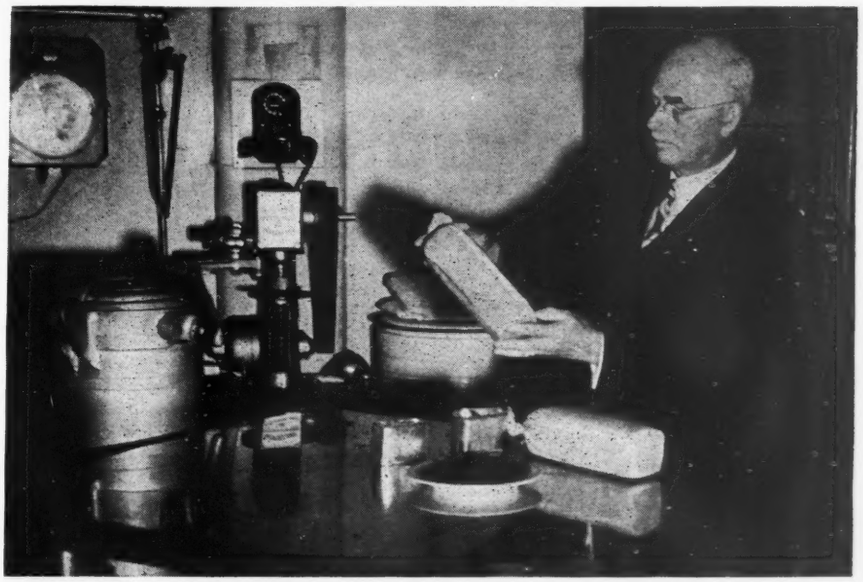
In detail the experimental procedure, which may have to be adjusted to meet commercial production conditions, is as follows:

Closely trimmed lean meat of specified fresh and inspected quality is run through a standard grinder, using a plate which gives ¼-in. cubes of meat. Then the meat is put into a double-arm mixer of the type commonly used in a ground-meat department.

To the meat in the mixer is added 0.5 percent by weight of emulsified lecithin, 2 percent of sodium chloride and 6 oz. per 100 lb. of meat of a co-crystallized sodium nitrate-sodium nitrite salt mixture[1] known as Prague powder.[2]

After a 3-minute mixing period, the contents of the mixture are discharged into a standard meat trough and placed in a 34- to 36-deg. F. cooler for 12 to 15 hours, or overnight.

Following this curing period, the mixture is run through an ⅛-in. plate grinder into a sausage stuffer by which it is forced into a 3x3x12-in. stockinet or heavy cloth bag of the kind commonly used in making summer sausage lunch loaves of 6 lb. net weight.



Preparatory to precooking for dehydration by the Griffith procedure, the cured ground meat is stuffed into cloth bags or stockinets commonly used in making 6-lb. summer luncheon loaves. E. L. Griffith is examining one of the stockinets of meat.

In these bags the pork is cooked for 4 hours at 150 deg. F., preferably in a steam box at 95 to less than 100 percent relative humidity to avoid loss of water-soluble vitamins and hot-water-soluble proteins. At the end of the cooking period the meat-filled bags are hung in a 34- to 35-deg. F. cooler overnight, or until thoroughly congealed to give a firm physical adhesion of the pork fat to the protein, aided by the added lecithin.

When fully cooled, the bags are taken directly to the grinder or are transferred to a central dehydrating plant. In either case, the meat is run through a ⅜-in. grinder plate preparatory to dehydrating.

If the ground pork is to be dehydrated in a smoke house, it is spread out on trays in 1- to 1½-in. layers and subjected to smokeless heat of 120 deg. F., the smoke house dampers being open to give an air flow. This process continues for 3 to 4 hours or until the moisture content desired for packaging has been obtained.

If the dehydrating is carried on at a central plant in a large-capacity unit, the conditions and time of dehydrating will vary, of course, with the type of dehydrater used.

Although, as yet, no specifications have been set for dehydrated pork, the moisture content is likely to be somewhere in the range of 7 to 10 percent and the fat content to be in the range of 38 to 40 percent.

As in the case of dehydrated beef, dehydrated pork lends itself to packaging under 2,000 lb. per square inch pressure, in airtight containers and under vacuum.

The process is a modification of the procedure disclosed in U. S. Patent No. 2,224,397, issued Dec. 10, 1940, pertaining to the making of sliced dried beef, and the method is covered by subsequent patent applications. But it is available to the meat packing industry "for the duration" without charge, if specifications finally adopted by the Agricultural Marketing Administration include the product so produced.

Keeping tests, carried on under incubator control as well as at room temperatures, over a period of two months revealed no development of rancidity in the meat, or loss of good eating qualities. The lecithin is considered to act as an antioxidant as well as an aid in obtaining a relatively uniform distribution of the pork fat throughout the mix in combination with the protein.

Because of the temperatures at which meat is precooked and dehydrated to maintain its nutritive qualities, only top-quality, well-refrigerated pork should be used. And all operations should be carried on under the best of housekeeping conditions and under vigilant inspection and supervision to assure a top-quality finished product. In that respect the production of dehydrated pork, or, for that matter, any meat, is no different from the production of dehydrated eggs or whole milk. The highest possible level of plant sanitation and critical selection of raw materials used are as important as the dehydration procedure employed.

[1] *Industrial and Engineering Chemistry*, vol. 33, p. 98 (January, 1941).
[2] U. S. Patent No. 2,054,624.

Army Standards For Dehydrated Foods

Tentative specifications for dehydrated foods for Army use have been issued by the Quartermaster Corps. "Food Industries" this month lists the official requirements for dehydrated white potatoes, sweet potatoes, rutabagas and beets, to serve as a reference to packers of these products

TENTATIVE specifications for dehydrated white potatoes, sweet potatoes, rutabagas and beets were issued by the Quartermaster Corps on September 3 and 4, 1942. What these specifications are is told in the following paragraphs. To avoid repetition, those parts of the specifications which apply to all four of the dehydrated vegetables are presented first, and then come the specifications which pertain only to the product named in the heading under which they appear.

General Specifications

Applicable specifications: The following are existing specifications which apply to the four dehydrated vegetables:

Tentative U. S. Army Specification No. 22-42, "Supplies, Subsistence, for the United States Army, Conditions Governing the Purchase of."

U. S. Army Specification No. 100-2. "Standard Specifications for Marking Shipments."

Quartermaster Corps Tentative Specification, OQMG No. 12-A, "Packing for Overseas Shipments."

Methods of inspection and tests are the same for dehydrated white or Irish potatoes, sweet potatoes, rutabagas and beets. These are as follows:

The inspection shall be made at point of origin; the test to show the absence of the peroxidase system shall be made according to methods acceptable to the inspecting agency, and the moisture determination shall be made by the vacuum oven method by drying two grams of the product at 70 deg. C. for 6 hours in partial vacuum having a pressure of not over 100 mm. mercury, or by any other method suitable to the inspecting agency.

Packaging

Packaging specifications are identical for all four dehydrated vegetables, which are to be packed in a laminated glassine sealed bag constructed of one of the following films:

(1) Two sheets of glassine, each of 25-lb. basis weight stock (24"x36"x500) laminated with not less than 8 lb. of permanently plastic laminating agent per ream. (2) A laminated film consisting of one sheet of not less than 0.0009-in. thick moisture-vapor-resistant heat-sealing cellophane, laminated to either glassine of 25-lb. basis weight per ream (24"x36"x500) or sulphite paper of 30-lb. basis weight per ream (24"x36"x500), with 8 lb. of permanently plastic laminating agent per ream. (3) A laminated film consisting of two sheets, each of not less than 0.0009-in. thick moisture-vapor-resistant heat-sealing cellophane laminated with not less than 3 lb. of plastic laminating agent per 1,000 sq. ft.

This bag may be of flat or gusset style, or may be mechanically formed, but the bag (except for the closure) shall be completely sealed by application of heat or moisture-vapor resistant adhesives. After filling, these bags shall be closed by either heat-sealing or may be folded over at least two full folds and taped down with 60-lb. gummed kraft tape which shall adhere to the bag. The tape shall be applied at right angles to the fold and at least two strips, one on each side of the bag, shall be used. In lieu of these two methods of closure, the mouth of the bag shall be folded over once about 1¼ in. from the end. The top of the bag shall then be folded in the reverse direction, the fold being made about ½ in. from the top of the bag. This fold must be stapled in place by closing six wire staples through the four thicknesses of folded bag. This bag shall have the same inside dimensions as the inside dimensions of the outer bag.

The inside bag shall be placed in a second sealed bag of the following description: A completely sealed envelope composed of minimum 40-lb. per ream (24"x36"x500) dense kraft paper laminated with not less than 15 lb. asphalt per ream, softening point minimum 155 deg. F., to a composition lead foil of not less than 0.00055 in. thickness, then laminated on the foil side to a sheet of moistureproof, anchored, coated, regenerated cellulose film not less than 0.0009 in. in thickness coated on the outside with 2½ in. per ream of a thermoplastic film sufficient to provide a face to face heat-sealed seam of adequate strength, laminated into one integral sheet. This is formed into a flat envelope by application of heat. The bag shall be slightly oversize in respect to the carton which contains it.

The product packaged in the above manner shall be inserted in a 0.090 in. weatherproof, solid fiber carton of approximately 1,200 cu. in. (5-gal.) capacity. These cartons need not be steel banded. Unless otherwise specified, the label on each container shall be marked with the name and type of product, the net weight, the month and year of dehydration, the name and address of the packer, location of the processing plant, and specific directions for rehydration. Two of the cartons shall be placed in a solid wooden box. All strap iron or wire bands shall be securely fastened and the ends cut off or secured to prevent injury to clothing or hands. Shipping containers shall be marked with name and type of product, the net weight of the product, the gross weight and cubic displacement of the container, the date of processing, the name of the contractor, the number of the contract or order, and date of packaging. Ink used in marking containers shall take on wood or fiber and shall be water-fast and sun-fast.

All deliveries shall conform, in every respect, to the provisions and regulations of the Federal Food, Drug and Cosmetic Act. The product and packages shall be free from insect infestation.

Individual specifications for the dehydrated vegetables follow.

Potatoes, White or Irish, Dehydrated

White or Irish potatoes shall be of such of the following types as may be specified in the invitation for bids: sliced, diced (cubed), stripped (Julienne style), shredded or riced (precooked), powdered (precooked); and of the grade indicated herein.

The potatoes used for dehydration shall be clean, sound, mature, of white variety, of good cooking quality, mealy in texture when cooked, and those which discolor or become soggy after boiling shall not be used. The dehydrated product shall be prepared under sanitary conditions and in accordance with the best commercial practice. Potatoes of No. 2 grade or better, except for size, should be used.

Preparation

The potatoes shall be thoroughly washed to remove soil and foreign material and sorted to remove any potatoes that are diseased or damaged. The sound stock shall be peeled, trimmed to remove the eyes and discolored portions, and either immersed in potable cold water or a clean 2 percent salt solution to prevent darkening.

The potatoes shall be cut into slices not less than 2/16 in. more than 4/16 in. in thickness; or into dice not less than $\frac{2}{16}$ in. nor more than 6/16 in. in width and thickness; or into strips (Julienne style) not less than $\frac{2}{16}$ in. nor more than 6/16 in. in width and thickness, and not less than ¾ in. in length. If the cut pieces are to be held for more than 30 minutes, they should be kept under running potable cold water or in a clean 2 percent salt solution, never being held for more than one hour prior to blanching.

(Turn to page 100)

MANAGEMENT

Salvaging Plant Scrap • Truck Maintenance Plan

Here is a 40,721-lb. pile of strategic materials collected by two St. Louis soft drink bottlers from their dealer outlets. You may not have dealer outlets, but you have scrap in your plant which can be salvaged.

Get In Your Scrap! —Here's How To Do It

Every plant manager should organize a salvage committee. Scrap metal just now is most vital to the war effort. The bottlers have turned in 17,000,000 lb. What the bottlers can do other food industries can do

INDUSTRIAL salvage and conservation form the backbone of the War Production Board's campaign to put the nation's waste back into production. Unless American industries take on the major job of making broken down, dismantled or unusable materials available for scrap, the national supply of steel for war manufacture will be endangered, holding up production of the steel which goes into the planes, tanks, guns and ships we need to win the war.

One of the most effective salvage campaigns is being conducted by the soft drink industry, which has turned in over 17,000,000 lb. of scrap metal in the last few months through its widespread trucking facilities. The campaign, which is reaching into the storerooms and cellars of retail stores in every corner of the country, is continuing with the object of salvaging 120,000,000 lb., according to the Conservation Division of WPB.

To tap the supplies of iron, steel, copper, brass and aluminum lying idle on the premises of crossroad stores from Maine to California, 6,400 bottlers have pledged the continued assistance of their trucking facilities to a million and a quarter retail outlets. This is perhaps the widest coverage of any manufacturer to retailer distributing system operating in these days of limited gasoline and tire supply.

The problem of reaching into the crossroad stores has been one of the most difficult presented to the WPB Conservation Division. Many types of cars reach the outlying sections in the course of deliveries of the scores of items carried by the small rural stores, but the soft drink truck is especially well suited for the purposes of the National Salvage Program because of its ready entree to the unmined scrap piles lying dormant in the back rooms and cellars of literally tens of thousands of stores far removed from the centers of scrap collection. The soft drink industry's organized salvage campaign is one more indication of the success of the stepped-up momentum of the National Salvage Program; it is a stirring example of what can be done to further the nation's war effort.

Organizing for Scrap Collection

The organization to operate an effective salvage collection within a company need not be elaborate or expensive. A company executive, armed with authority to scrap unused material, heads the committee as salvage manager. He is assisted by superintendents and foremen in various departments, who make a survey of their departments and report on the equipment that is obsolete and out of production.

With these findings as a basis for action, it is management's function to inspect the equipment and decide where it will prove most effective—either disposing of the equipment in industry if there is a call for it, or turning it in for scrap to accelerate the production of war equipment.

(*Turn to page* 111)

This Plan Will Keep Trucks Rolling Longer

A victory maintenance procedure which can be applied to all types of gasoline and diesel trucks. Planned preventive maintenance is essential for the duration

PREVENTIVE truck maintenance is now highlighted by the war and the necessity for fleet owners in the food field to keep their present equipment in service for the duration. To keep 'em rolling, truck fleet operators must follow a definite maintenance program, such as the preventive maintenance procedure of the General Motors Truck & Coach Division of the Yellow Truck & Coach Mfg. Co. of Pontiac, Mich. This procedure is adaptable to all types of gasoline- and diesel-powered trucks, tractors, coaches and trailers as a means of securing reduced transportation and maintenance costs. The system is part of the G.M.C. victory maintenance program designed to help G.M.C. dealer organizations contribute their share of the national effort to keep our civilian trucks on the job until the war is won.

Scientific Method

The G.M.C. preventive maintenance procedure sets up a scientific method of anticipating and performing required maintenance operations and of accumulating and interpreting operating and maintenance data to reduce operating and maintenance costs, minimize out-of-service time, increase equipment life, reduce accidents and spotlight driver abuse and inefficient servicing.

15 Work Sheets Used

The performance of the required maintenance operations at specific mileages is accomplished by the use of a series of eleven mechanical work sheets, two of which are reproduced herewith. These sheets prescribe the exact services to be performed. Thus work to be done is no longer left to the judgment of the individual mechanic. Each man receives the same guiding charts to govern his procedure.

The remaining four sheets of the system, making a total of fifteen in all, include a preventive maintenance service schedule, shown in part herewith, a fleet service record, a service code sheet and a history record.

The service schedule enables the preventive maintenance to be planned in advance, and it also eliminates the peaks and valleys of shop work, which in itself is an economy. The fleet service record is a large wall chart on which is set down a running record of all the mechanical work performed on each vehicle.

The service code sheet provides a simple, easily interpreted method of coding entries made on the fleet service record wall sheet. All of the work done which is not listed to be performed on one of the eleven mechanical work sheets is coded and entered in a manner contrasting to that of the regular work-sheet operations. If these contrasting coded entries become numerous, it indicates the necessity of changing the procedure of the regular mechanical work sheets to eliminate the "in-between" repairs.

Purpose of History Record

The preventive maintenance history record gives the history and dictates the replacement period of those units which experience proves should be treated individually rather than under the broad scope of one of the eleven mechanical work sheets. In this manner, repairs and replacements may be made to all important units of the vehicle prior to failure by fact rather than by guess.

Of the eleven mechanical work sheets of the system, six cover gasoline trucks

GMT 301 30M - 2-41
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General Motors Truck & Coach
DIVISION OF
YELLOW TRUCK & COACH MANUFACTURING COMPANY

PREVENTIVE MAINTENANCE WORK SHEET
LIGHT DUTY "A" SERVICE — ½ to 1½ TON ONLY
To be Performed at Each 1,000 Miles or 30 Day Interval

OWNER _____ MODEL AND CHASSIS No. _____ DATE _____ TRUCK No. _____

ADDRESS _____ MILEAGE _____ R. A. No. _____

(√) O. K. (X) ADJUSTMENTS MADE (O) REPAIRS NEEDED

½ to 1 Ton	1½ Ton		½ to 1 Ton	1½ Ton	
	1.	Clean and adjust spark plugs. (See Instruction Manual for gap spacing.)		17.	Check operation of doors, door locks and window regulators.
	2.	Clean and adjust distributor points. (See Instruction Manual for point spacing.)		18.	Check rear axle lubricant level; add lubricant if necessary.
	3.	Check ignition timing.		19.	Check transmission lubricant level; add lubricant if necessary.
	4.	Tighten cylinder head (use torque wrench), manifold, governor and carburetor flange bolts.		20.	Inspect for oil and gasoline leaks.
	5.	Adjust valves—VALVE-IN-HEAD ENGINES ONLY. (See Instruction Manual for Clearance.) Is overhead getting oil?		21.	Check for grease leaks.
				22.	Fill battery with distilled water.
	6.	Adjust carburetor. (Set with vacuum gauge where possible.)		23.	Fill radiator with water or check anti-freeze as necessary.
	7.	Check generator mounting and pulleys for looseness.		24.	Tighten all wheel nuts.
	8.	Adjust fan belt (Not too tight).		25.	Tighten axle shaft flange bolts.
	9.	Check crankcase oil level.		26.	Inflate tires. RF ____ lbs.; RR ____ lbs.; LF ____ lbs.; LR ____ lbs.
	10.	Tighten hose connections.		27.	Check condition of fenders, running boards, splash aprons.
	11.	Clean fuel pump strainer.		28.	Check and record: Oil Pressure ____ Charging Rate ____
	12.	Check front wheel bearings and inspect steering knuckle pins for looseness.		29.	Check gas gauge, heat indicator, and horn.
	13.	Inspect drag link and steering arms for looseness and out-of-alignment.		30.	Check hand brake (adjustment not included).
	14.	Check play in steering wheel.		31.	Test all lights.
	15.	Adjust clutch pedal for clearance.		32.	Road test vehicle ____ check brakes ____ speedometer ____ and note general condition ____
	16.	Lubricate chassis according to lubrication chart. (a) Oil and inspect all brake linkage, pedal controls, choke, carburetor linkage, door hinges and locks.			

Neglect of the following units frequently causes road failures; therefore operators not using the Extended Preventive Maintenance Plan should be guided by the following recommendations:

Apply Heavy Duty "A" Service, form No. 200 for complete motor tune and other important adjustments ..... each 5,000 miles		Replace dist. points, condenser and high tension wires ..... each 15,000 miles	
Clean or replace oil filter element ..... at approx. each 5,000 miles		Replace or recondition fuel pump ..... each 15,000 miles	
Clean crankcase ventilator ..... each 5,000 miles		Replace carburetor jets .... at approx. each 15,000 miles	
Grease speedometer cable .. at approx. each 10,000 miles		Replace distributor rotor and cap ..... each 30,000 miles	
Replace spark plugs ..... at approx. each 10,000 miles		Clean air cleaner ..... as necessary	
Clean and repack wheel bearings and replace rear wheel grease retainers ..... each 12-15,000 miles			

REMARKS: _____

SIGNED _____
(Use other side for remarks)

The 1,000-mile G.M.C. preventive maintenance sheet as employed in connection with keeping ½- to 1½-ton trucks in continuously good running condition.

and tractors, two are for diesel-engined trucks and tractors, one for trailers and two for gasoline coaches or buses.

Of the six gasoline truck and tractor work sheets, the first two are, respectively, for light-duty ½- to 1½-ton trucks and for trucks and tractors of over 1½-ton rated capacity. These give the service operations to be performed every 1,000 miles throughout the life of the vehicle or, on low-mileage trucks, every 30 days. Each sheet includes a list of the units to be adjusted to effect economy. The sheets also provide for a thorough lubrication and general inspection. For better economy, the time is checked, the carburetor adjusted, the spark-plugs cleaned and spaced, and so forth.

The third work sheet covers operations to be made at 5,000-mile intervals. These include all of the 1,000-mile items, plus others such as checking wheel alignment, examining grease retainers and bearings, inspecting and adjusting brakes, cleaning the crankcase ventilator and checking the generator and adjusting the charging rate.

The fourth, fifth and sixth mechanical work sheets cover, respectively, the operations to be taken care of at 15,000, 30,000 and 60,000 miles. At the latter mileage the installation of a factory-reconditioned engine is specified, or a complete engine overhaul for those trucks whose manufacturers do not offer an engine-exchange service.

GMT-218 SM 2-41

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General Motors Truck & Coach

Division of Yellow Truck & Coach Manufacturing Company

PREVENTIVE MAINTENANCE WORK SHEET

GASOLINE TRUCK AND TRACTOR "E" SERVICE

DATE_____

OWNER _____ MODEL AND CHASSIS No. _____ TRUCK No. _____

ADDRESS _____ MILEAGE _____ R. A. No. _____

(√) O. K.	(X) ADJUSTMENTS MADE	(O) REPAIRS NEEDED
1.	ENGINE INCLUDES: Install Remanufactured Engine—or remove engine and overhaul completely as follows: Grind Valves—Replace valves and inserts as necessary—Replace valve springs—Recondition valve mechanism—Clean side plates and block—Rebore block—Replace Pistons—Rings—Pins—Replace Rods or rod bearings—Rework or replace crankshaft and replace bearings as necessary—Replace all gaskets—Replace cam gear—other timing gears as necessary—Overhaul oil pump—Clean all oil lines and screens—Clean or replace oil filter—Report on: Oil pressure—lbs. Replace spark plugs—(See Instruction Manual for Gap Spacing). Adjust valves—(See Instruction Manual for clearance). Tighten all motor support bolts—Replace rubber insulators where necessary—Tighten side pans—.	
2.	COOLING SYSTEM: Includes: Remove—Clean—Install radiator—Replace hose—Overhaul water pump—Replace belts—.	
3.	DISTRIBUTOR: Includes: Overhaul—Replace Condenser—Replace Distributor points—Rotor and cap—Oil distributor wick—Grease cam—Fill grease cup—Replace high tension wires—Report on: Voltage at points when open—(Should be same as battery.) Voltage at points when closed—(Should be zero.) Replace Primary wiring—Ignition switch—.	
4.	GENERATOR: Includes: Remove and clean thoroughly—Turn down commutator—Replace brushes—Test—Install—Tighten primary connections—.	
5.	STARTER: Includes: Remove and clean thoroughly—Turn down commutator—Replace brushes—Replace drive if necessary—Tighten cable connections at starter securely—Check switch—.	
6.	FUEL PUMP: Overhaul or install reconditioned fuel pump, using new gasket—Test pump outlet pressure—(See Instruction Manual for Pump Pressures)—Test pump vacuum pressure—(6 inches minimum).	
7.	CRANKCASE VENTILATOR: Includes: Remove, Clean and install—.	
8.	COIL TEST: Coil—Ampere draw should be 1½ Amps. at 15 m.p.m. Spark gap—mm. Ampere draw—amp.	
9.	CARBURETOR: Includes: Remove—Overhaul and Install—Clean air cleaner—Oil choke and throttle linkage—Adjust with vacuum gauge—.	
10.	BRAKES: Includes: Remove and Install Wheels—Clean or replace Drums—Bearings, etc. as necessary—Replace all retainers—Reline shoes and adjust all brakes—Replace or overhaul master cylinder—Wheel Cylinders—Bleed system—Tighten all fluid connections—Overhaul Booster—Valve—Replace or rebush rods, cables and cross shafts as necessary—Inflate Tires—R. F. ....lbs.; R. R.....lbs.; L. F.....lbs.; L. R.....lbs	
11.		REAR AXLE: Includes: Remove differential—Make replacements as necessary—Clean differential housing—Fill with new lubricant—.
12.		FRONT AXLE: Includes: Replace spindle bolts and bushings—Replace tie rod ends—Check caster and camber—Overhaul Steering and all steering connections.
13.		SPRINGS and SHACKLES: Includes: Replace broken spring leaves or center bolts as necessary—Tighten U Bolts—Rework shackles as necessary—Rework radius rods as necessary.
14.		TRANSMISSION and CLUTCH: Includes: Remove transmission—Disassemble—Replace parts as necessary—Overhaul pressure plate—Reline or replace drive disc—Replace pilot bearing—Overhaul transmission cover if necessary—Reline emergency brake if necessary—Check throwout bearing thoroughly—replace if necessary—Assemble and refill with new lubricant—.
15.		UNIVERSAL JOINTS and HANGER BRGS.: Includes: Disassemble joints and replace parts as necessary—disassemble hanger brg.—Replace oil seals—Replace brg. or brg. housing if necessary—.
16.		CHASSIS LUBRICATION: Lubricate according to lubrication chart. Oil hood pulls—Door hinges—Locks—Lubricate Speedo cable—Oil Booster both ends—2 oz. each end of cold test oil. (Pour test at least 30 degrees below zero.)
17.		BATTERY: Includes: Test gravity 1—2—3—. Should be 1275. Fill with distilled water—Clean and Tighten Connections—Replace cables as necessary—Tighten battery in case—Report on: Open voltage—volts. Battery box—General condition—Replace if necessary—.
18.		LIGHTING SYSTEM: Includes: Replace bulbs as necessary—Tighten all lighting connections—Make stop lamp work—Report on: Horn operation—Wiring—Headlamps—Bright—Dim—Side Lamps—Dash Lamps—Tail Lamp—Stop Lamp—Spot Lamp—Lighting Switch—Dimmer Switch—Road Lamps—Clearance Lamps or Reflectors—Trailer hook-up plug—Receptacle—.
19.		FENDERS, ETC.: Includes: Tighten fenders—Running boards—Aprons—Bumper—Report on: Top covering—General condition—.
20.		BODY: Includes: Clean glass, remove all grease and finger marks—Clean inside of cab with air—Tighten rear cab bolts—Body bolts—Change wiper blade and Hose if necessary—Report on: Glass—Door locks—Handles—Window regulators—Gas gauge—Air gauge—Front cab pads—Springs—.
21.		MISCELLANEOUS: Includes: Road test vehicles. Report on: Speedometer—Muffler—Heat Indicator—.

REMARKS:—Any items marked (O) outline in detail.

Signed: _____

(For Further Remarks Use Other Side)

Another one of the eleven G.M.C. preventive maintenance work sheets. This one covers the work to be done every 60,000 miles.

GMT 325
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General Motors Truck & Coach

DIVISION OF
YELLOW TRUCK & COACH MANUFACTURING COMPANY

PREVENTIVE MAINTENANCE SERVICE

SCHEDULE

MECHANICAL ☐

LUBRICATION ☐ MONTH_____ YEAR_____

Truck No.	Route No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

The G.M.C. preventive maintenance system schedule by which the trucks are brought into the shop in the proper order.

FIG. 1. Arc welding made the construction of these flume gates a relatively simple matter. These control the outlet of the beet hoppers at the railroad siding.

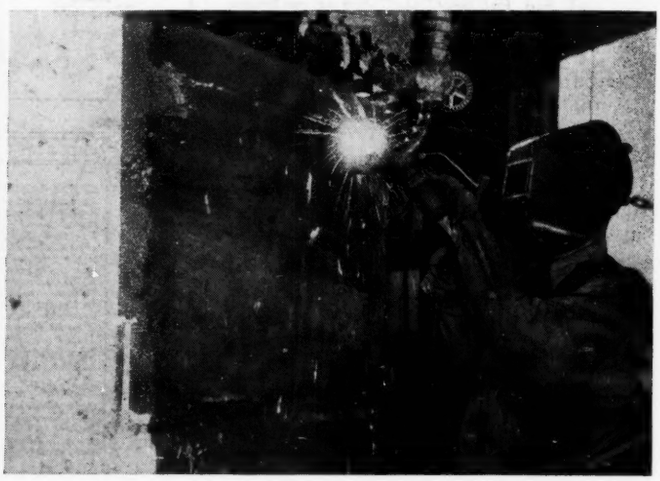


FIG. 2. Attaching an ammonia vent to a vacuum pan, as shown here, is a simple operation by welding. The sugar is boiled to a grain in the vacuum pans.

Welding Speeds Plant Construction, Maintenance

By C. M. TAYLOR
Vice-president, Lincoln Electric Co., Cleveland, Ohio

Pans, hoppers, pipes, tanks, conveyors and other food plant equipment can be fabricated or repaired with relative ease and speed by welding

IN a modern sugar plant the elaborate system of hoppers, pipes, pans and conveyors presents a real problem in construction and maintenance. Engineers at the American Crystal Sugar Co., Rocky Ford, Col., find that arc welding greatly facilitates such work.

Typical of the welding applications which have simplified construction at the plant are the flume gates shown in Fig. 1.

These gates are used to control the outlet of the hoppers at the railroad siding. Water is circulated through these channels and the sugar beets are carried by this means into the plant for processing. The gates are made from 14-gage arc-welded sheets. They slide up and down in a channel which is made from two 1 by $\frac{1}{8}$-in. bars welded to the sides of a $\frac{1}{4}$ by $\frac{1}{4}$-in. bar.

Before being passed on to the centrifugals, the sugar is boiled to a grain in a vacuum pan. In Fig. 2 a welder is shown using the electric arc to fasten an ammonia vent to a vacuum pan—a simple operation by welding.

The many hoppers and similar structures throughout the mill are also of welded construction, a number of them being built from salvaged steel plates and shapes. The wet sugar bin (Fig. 3) between the centrifugals and granulators was so constructed. This was built from $\frac{1}{4}$-in. plate braced by 3-in. angles. The supporting members are 8-in. channels, arc welded.

Sugar falls from the centrifugals to scroll conveyors through specially constructed chutes. These chutes, shown in Figs. 4 and 5, are made from 14-gage sheet welded to 1-in. angles. Fig. 4 shows a welder at work on one of the chutes, and Fig. 5 is a view of the other side.

Use of electric arc welding eliminates many of the "headaches" encountered with other types of structures and fastenings. For example, in Fig. 6 is shown the side of a lime kiln shell—75 ft. high—which formerly had a seam comprising two angles set back to back, fastened togther and to the shell plate. The fastenings joining the angles frequently broke off as a result of stress caused by heat expansion. These angles were removed from the shell and an 8-in. strap was lap welded to the plate, which provided a permanent, tight seam.

Naturally, much pipe is used in a sugar plant, and this provides an ideal application for arc welding. Fig. 7 shows welded piping typical of the thousands of feet found in this modern sugar mill. The piping shown in this picture includes a 16-in. steam-vapor line, with 4-in. lead-offs to the battery of diffusion cells. The lines at the right are $2\frac{1}{2}$-in. washout lines for the cells.

More piping of welded construction is shown in Fig. 8. A 36-in. line to the evaporators, a 24-in. line to a battery of raw juice and carbonation heaters and an 8-in. steam line (at top) are illustrated.

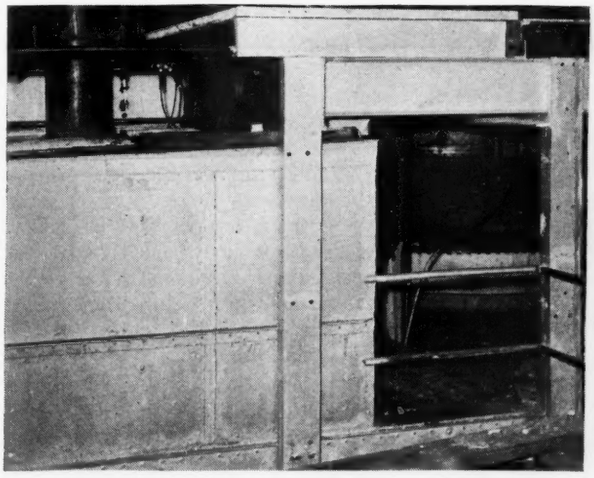


FIG. 3. This wet sugar bin was built by means of arc welding from salvaged steel plates and shapes.

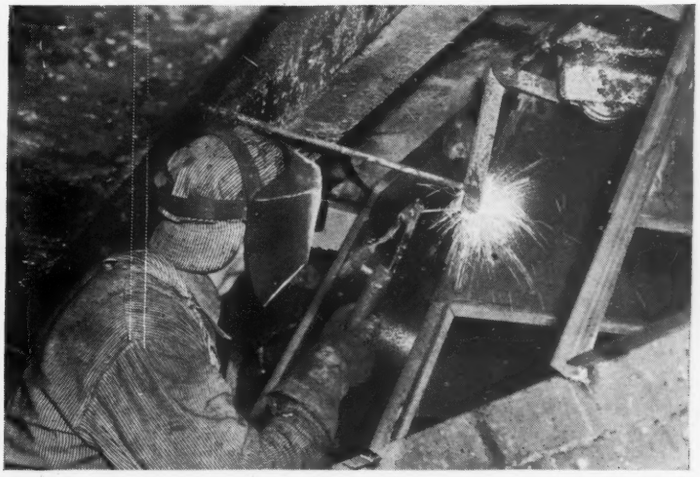


FIG. 4. Welder at work on a chute used to carry the sugar from the centrifugals to the scroll conveyors.

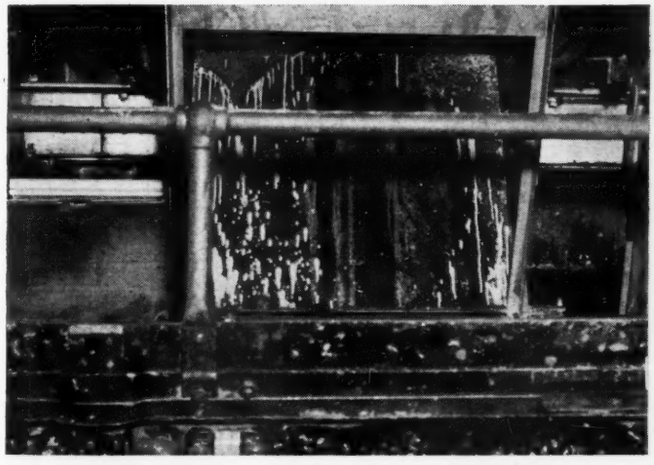


FIG. 5. Another view of the chute shown being welded in Fig. 4. It carries sugar to scroll conveyors.

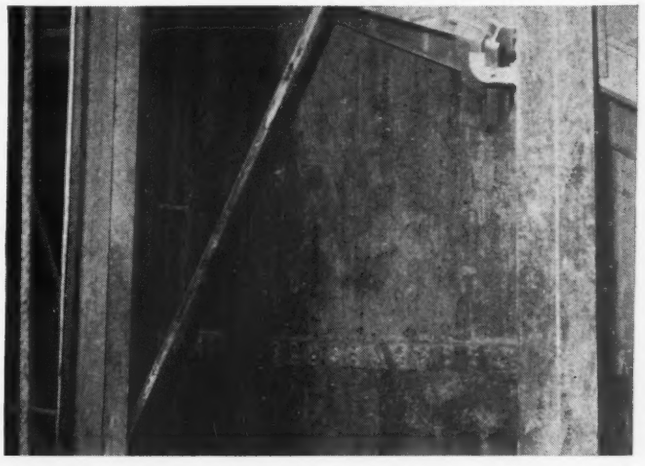


FIG. 6. Welding the vertical seam in this lime kiln shell eliminated troublesome breaking of the fastenings.

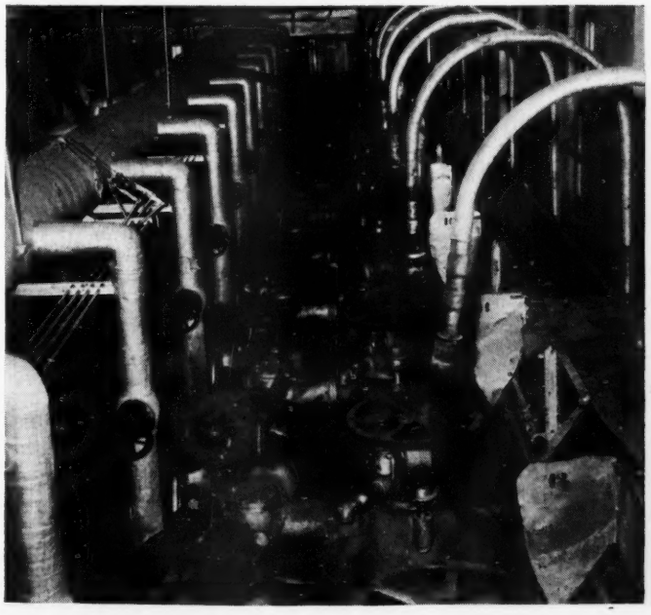


FIG. 7. Welded steel pipe such as this is strong, leak-proof and permanent and may be installed quickly.

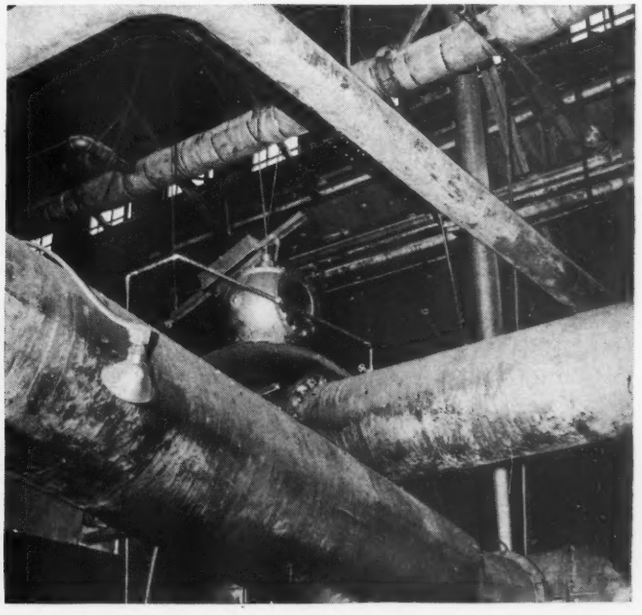


FIG. 8. Another installation of welded steel pipe at the plant of American Crystal Sugar Co.

Improved Processing Helps To Accomplish Wartime Food Job

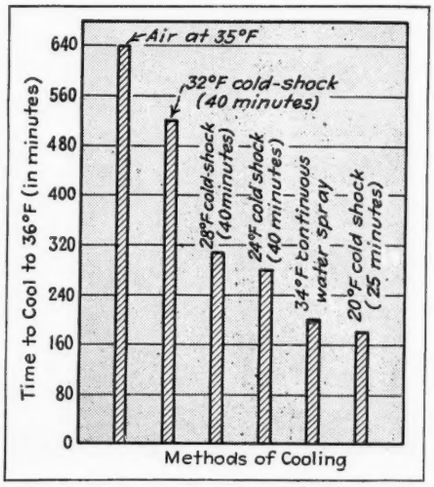
By HARRY E. DREWS,
Poultry and Egg Processing Specialist, Barker Poultry Equipment Co., Ottumwa, Iowa; National Wax Co., Chicago, Ill.

PART II—"Shock" cooling speeds production and improves quality of poultry. Better evisceration equipment and methods developed. Substitute for stainless steel pans introduced

PROMPT cooling to near the freezing point of the carcass is of utmost importance in delaying deterioration and in helping to retain the best in eating quality. Effective quick cooling of the dressed poultry in the shortest possible time has been one of the most serious problems in the poultry packing industry. From a standpoint of compactness, efficiency and low cost of operation, the tank system with agitation of the water left much to be desired. The recent development of the "shock-cooling" method through the cooperative efforts of the poultry products laboratory of Iowa State College, Armour Creameries and the Barker Poultry Equipment Co. has provided a practical and fundamental answer to this problem.

Shock-cooling is a method of quick cooling poultry which utilizes a coarse spray or splatter of brine, at temperatures of from 24 to 32 deg. F., over poultry hung in a regular manner on standard poultry racks. The operation is carried on in an insulated booth or chamber. There is a sump below the racks for reclaiming the brine, which is filtered, recooled and recirculated through the system. The essentials of the system are cooling racks, spray nozzles and piping system, filter, booth, pump and heat exchanger. High-pressure pumping is not an essential, as the sprays operate well at pressures of from 30 to 60 lb. per square inch. In view of the needs for expansion of this improved method, the difficulty in obtaining materials under war conditions and the fact that much of the necessary material for the installation of the system is available in most poultry plants, the improved system is being released without any patent restriction by those who developed it. Also, aid is being given to those plants where the owners wish to construct their own shock-cooling system.

The results of shock-cooling are striking in comparison with established methods of cooling poultry formerly used, and still in use in many plants. The prompt exposure of the poultry, as soon as removed from the picking lines, to a 24-ft. brine spray for a period of from 15 to 20 minutes for small sizes up to 40 minutes for turkeys gives a quick strong start in temperature reduction. Then the birds are wheeled out of the spray chamber, washed off with a spray of water, and wheeled into the packing room. The temperature reduction continues as the outer portion of the birds warms up and the insides cool in the equalization of temperature that occurs. Packing of the poultry for commercial shipment on the same day on which it is killed is made possible by this method of cooling. This possibility is an important economic, as well as a quality, factor in bringing the poultry one day nearer to the consumer. And it is particularly important to the processor who is operating at heavy volume in the face of a dropping market. It also makes possible the eviscerating of the poultry on the same day it is killed, with sufficient cooling and hardening of the internal fats and oils for the eviscerating operation to be carried on neatly and efficiently.



Spraying birds with 20-deg. F. brine for 25 minutes brings them to 36 deg. F. in approximately the same time (3 hours) as does continuous spraying with 34-deg. F. water, and in about one-third the time required with 32-deg. F. brine for 40 minutes.

The production volume of eviscerated or table-dressed poultry is increasing rapidly each year, as poultry of this type is gaining in consumer acceptance and sales channels are broadening. In addition to the local and domestic retail sales field, the rapid expansion of the use of canned boned poultry for Lease-Lend and for the armed forces is contributing to the market available to eviscerators of poultry. The increased

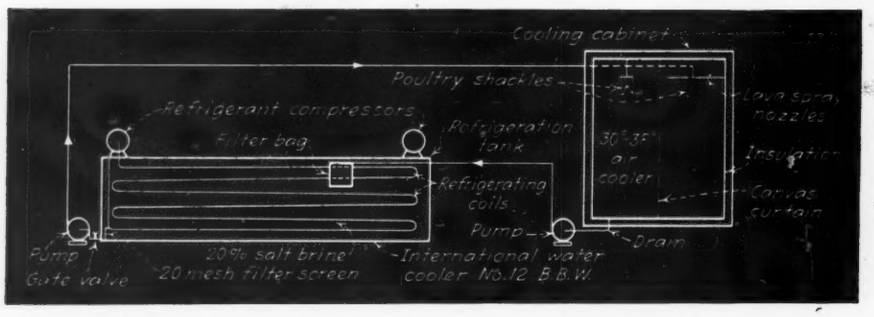
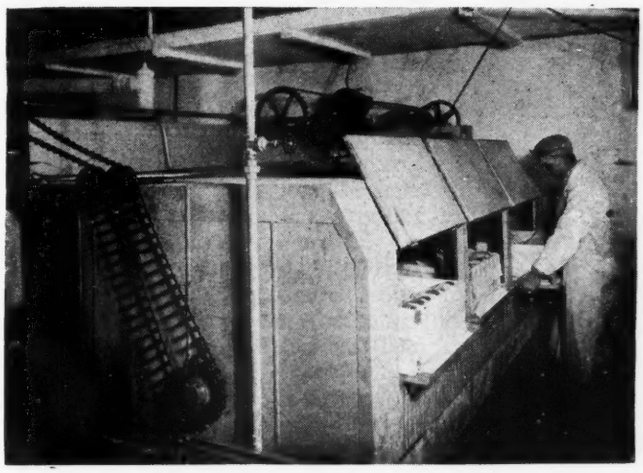


Diagram of the "shock" cooling system which utilizes a coarse spray of brine at temperatures of from 24 to 32 deg. F. This speeds the chilling of the birds and protects quality.



Tunnel-type quick freezers have contributed to the adoption of straight-line production methods for packing ready-to-cook poultry.

volume is bringing increased efficiency in operation, and it has brought a demand for equipment adapted to the more efficient methods.

Eviscerating Equipment Improved

Poultry evisceration equipment has been streamlined. The older type of equipment with frames of awkward angle-iron construction has been outmoded by new conveyor tables of sheet metal and channel construction, with improvement not alone in appearance and in the strength to weight ratio, but in sanitation and in ease of cleaning. Evisceration of poultry under government inspection is carried on with a minimum of two conveyor-type steel tables, with automatic cleaning, washing and sterilizing of the conveyor pans or trays during the operation.

Formerly all of the entrails were removed by the operators on the second table. Under the newer regulations and with the improved type of equipment, the viscera are automatically dumped at the end of the first of the two tables where they are emptied into tank carts that fit under the end of the eviscerating table. Giblets are now removed on the first table, where they are carefully taken from the viscera with the minimum of breakage and injury and placed in shallow layers in loose pressed-steel pans with a perforated, raised tray. Then they are promptly transferred to the special giblet washing and wrapping table where they are washed under gentle sprays of water, wrapped in parchment for replacing in the individual birds or packaged for bulk sale. Any portions stained by bile or injured in handling are carefully removed during the washing and cleaning process. Hearts, livers, gizzards and necks are separated and placed in individual trays at the original inspection table.

Under this system of operation only the final cleaning of the birds—removal of small loose bits of flesh and the lungs and kidneys — is left for the second or "work table" where the work is done on individual stationary trays before each operator. Each tray has water irrigation across its surface during the operation.

Because of the small volume of material removed on the second table, the large unsightly buckets and containers under the table to catch the cleanings from each operator have been eliminated. Small removable containers which fit into the table itself are used. All of the conveyor and work trays are now easily and promptly removable without tools, so that the tables can be quickly cleaned and sterilized at the end of the day's operations.

Labor has been reduced, sanitation in handling of the birds and in the equipment has been improved, handling of giblets has been reduced, and smooth efficiency of the entire operation has been improved through these changes in operating methods and operating equipment which have been approved by the Bureau of Agricultural Economics, which is in charge of the government inspection service at poultry eviscerating plants.

Substitute for Stainless Steel Pans

Pressed stainless steel pans have previously been used for all surfaces of the evisceration equipment that come in contact with the birds during the evisceration process. The severe shortage of stainless steel has made necessary the development of a satisfactory substitute. The War Production Board, acting through the Bureau of Animal Industry of the U. S. Department of Agriculture and the Bureau of Agricultural Economics, has approved the use of pressed galvanized pans coated with a proper baked enamel of the synthetic resin type. Eviscerating trays coated with various types and colors of synthetic resin finishes have been put into trial operation and approval has been given to those which have proved to be sound.

Because of the needs of the poultry industry in the efficient handling of the heavy poultry volume, the savings in shipping weight and volume that are brought through evisceration, and the increasing use of eviscerated poultry, the War Production Board has made available some limited supplies of material for the proper maintainance of the present eviscerating equipment in operation and for a limited expansion of equipment of this type at those points where it is considered most necessary.

In spite of war conditions and equipment curtailment, the poultry processing industry is still stepping forward.

Maintenance of eviscerating rooms under government inspection standards to assure the desired sanitary conditions has been made possible by overhead trolleys, stainless steel tray tables and smooth-surfaced floors.

Asphalt Seal Makes Fiber Box Watertight

By STANLEY M. JACKSON

Director of Biochemical Laboratories, Loose-Wiles Biscuit Co., Long Island City, N. Y.

Container gets official O.K. as substitute for tin can in packing dry food for Army and Lease-Lend. Can be used by anyone on government contracts for duration. Protects food from water even on long immersion

IT looks so simple that one wonders why it was not thought of before. But difficult problems often look simple when solved, and a watertight container which uses no metal or other scarce material is no exception. The Loose-Wiles "Aqua-Proof Pack" looks simple because, essentially, it is nothing more than a weatherproof fiberboard container sealed at the seam and flaps with asphalt. But in reality there is seven months of research behind this development.

Type C ration biscuits for the armed forces originally were packed in tin containers. But early this year the Quartermaster Corps told representatives of the biscuit industry that it was necessary to develop a substitute container: "We want emergency ration containers that can, if necessary, be dumped into the water from supply boats and floated ashore, without a drop of water seeping into the contents. Or it may be that these rations for our Army forces might be deposited on open docks and remain for days exposed to rain and snow. If so, the containers must be tough enough to take it, and keep the contents completely protected. And remember, you can't use tin, black metal, foil, rubber, mycrocrystalline wax or any other materials vital to victory production."

To meet that challange, Loose-Wiles Biscuit Co. developed, tested and discarded one idea after another. Finally, after many misses and near-misses, the Aqua-Proof Pack was perfected. It met official test No. 171. And this container has been adopted by the Army, Navy and Lease-Lend authorities for watertight packaging of rations for soldiers, sailors and marines and for feeding the civilians of our allies. It has wide possibilities as a container for other dry food products, too. Briefly, here's how the biscuits are packaged. The first step is to pack the product in glassine-lined cardboard cartons sealed against moisture by a double wrapping of transparent, bleached, waxed sulphite paper. (This is a standard commercial carton except for the double wax wrapping). Then 12 of the 2-lb. cartons are packed into a container of weatherproof solid fiberboard of 0.090-in. caliper. This fiberboard container is sealed with asphalt, and two of such sealed units are then placed inside a large container made of the same material and also sealed with asphalt. Steel strapping completes the operations on the container. Here, you have, then, triple protection against water—the wax-wrapped cartons and two asphalt-sealed solid fiber containers, one within the other.

Important Details

Several important details contribute to the success of this packaging technic. First of all, the fiberboard containers come specially cut, the closing flaps being at the ends to give the smallest openings possible; and the flaps are so cut that there are no holes at the corners of the box when the flaps have been folded over. Secondly, as the cartons of biscuits are packed into the smaller fiberboard container, there is

"Aqua-Proof" container and four men of the Loose-Wiles Biscuit Co. technical staff who developed it. Note the three parts to the "package." Double-wax-wrapped cartons are packed inside an asphalt-sealed solid fiber container, two of which are put into a larger asphalt-sealed solid fiber container that is steel strapped. The four men are (left to right) Dr. Stanley M. Jackson, K. D. Loose, Alan Wiedersum and James Larrimore. The package shown here had been immersed for 12 days without shipping a drop of water.

placed between each tier of cartons a divider of 0.090 caliper fiberboard to give added strength and rigidity to the container and so protect the fragile biscuits. And thirdly, a layer of 0.018 caliper newslined chipboard is fitted snugly inside the bottom and top of each fiberboard container to prevent contact of the asphalt with the wax-wrapped cartons. And lastly, no adhesive is used on the containers except the asphalt used for sealing. Tests have shown that the presence of an adhesive under the asphalt provides a path by which water works its way inside the container.

How Asphalt is Applied

The method of sealing the fiberboard containers with asphalt is quite ingenious. The asphalt used is steam refined, free of objectionable odor and has a melting point of 150 to 160 deg. F. and a penetration factor of 35 to 45 at 77 deg. F. The asphalt is melted in a regular roofer's furnace and kept at a temperature of about 300 deg. F. in containers heated by gas burners (oil or electric heat could also be used).

To seal the flaps of the container, a workman dips an ordinary dish-washing mop into a small tank of the hot asphalt and smears the stuff thoroughly over and around the flaps and into the corners at the end of the box. Then the flaps are pressed down, the asphalt cooling immediately to a degree sufficient to give it good adhesive properties. Now the box is turned end for end and a second workman seals the flaps on the other end similarly with asphalt. A third man sets the carton lengthwise into a small trough filled with hot asphalt so that the boxmaker's seam is momentarily immersed and effectively sealed. As soon as the box is removed from the trough and passed to the next position on the production line, a workman quickly slaps a strip of asphalt-impregnated kraft paper over the corner that has been dipped, this paper forming a cap that has nothing to do with the seal except to maintain the asphalt and keep it from sticking to objects with which the container comes in contact. Next, a man sets one end of the container into a vat of hot asphalt, the vat having a false bottom so that the container is immersed only a couple of inches. The box is removed immediately, turned end for end, and a cap of the impregnated kraft paper placed over the dipped end. Then the other end is dipped and a cap applied to it.

Sealing of the smaller of the two fiberboard containers of the packaging ensemble is now completed. The next operation is to place two of the small containers inside a large one and then seal it with asphalt and apply impregnated paper caps as was done with the smaller containers. There is one difference in the technic of handling the large boxes, however. When it comes to setting them on end into the hot asphalt, their weight might cause a workman to slip and be burned by the asphalt if he attempted to handle a container by himself. So a "stretcher" or carrier has been devised by which two men handle the large containers when dipping the ends. This carrier is a steel frame with handles on each end. The frame is slipped over the container and a pivoted section is swung into place against the side of the box to make the carrier fit the box tightly and grip it while it is being lifted and dipped.

Part of the production line on which the solid fiber containers are sealed with asphalt. The large outer containers are shown here, along with the tank of hot asphalt into which the ends are dipped and the carrier which enables two men to handle one of the heavy containers. Note the asphalt-impregnated paper caps on the ends of the container and over one corner where the seam is.

The process of sealing and capping the containers moves along rapidly. The hot asphalt "sets" immediately, and there is no waiting during the dipping operations.

The workmen who handle the hot asphalt wear gloves and protect their arms with special sleeves or shields reaching from the wrist to the elbow. When the workmen finish the day they toss their gloves and arm protectors into a tank of naphtha to dissolve the asphalt preparatory to laundering.

Keeping asphalt at 300 deg. F. in flame-heated containers suggests a certain fire hazard, and Loose-Wiles has located a large fire extinguisher alongside the asphalt vats in case of flash-over fire.

The tanks which hold the hot asphalt into which the containers are dipped are about the size of dough troughs—in fact one of the two tanks used by Loose-Wiles is an old dough trough equipped with a false bottom. Gas burners are located under the tanks and temperature indicators assist in keeping the asphalt at 300 deg. Small tanks set over gas burners are used to heat the asphalt into which the dish-washing mops are dipped for smearing the flaps of the containers.

Lighter, Inexpensive

While incidental advantages are secondary in a container designed to meet certain military specifications, it is nevertheless interesting that the overall weight of the Aqua-Proof container, which holds 48 lb. net, is 12 lb. less than that of the tin container (and its wooden case) which it replaces, and in quantity production it will cost no more and possibly less.

All of the contracting Sunshine biscuit plants from coast to coast are already packing and asphalt-sealing the new watertight fiberboard container. And while Loose-Wiles may cover the development with patents, the container is available for the duration to anyone wanting to use it for government contracts.

MATERIALS

Glass Containers Standardized

WPB specifies 28 types and sizes in Limitation Order L-103

TO boost the nation's capacity for manufacturing glass containers and to economize on the use of materials in these containers, WPB has designated 28 types and sizes of food bottles, jars and jugs as standard containers. Each of the containers is illustrated on these pages. The specifications are from Limitation Order L-103.

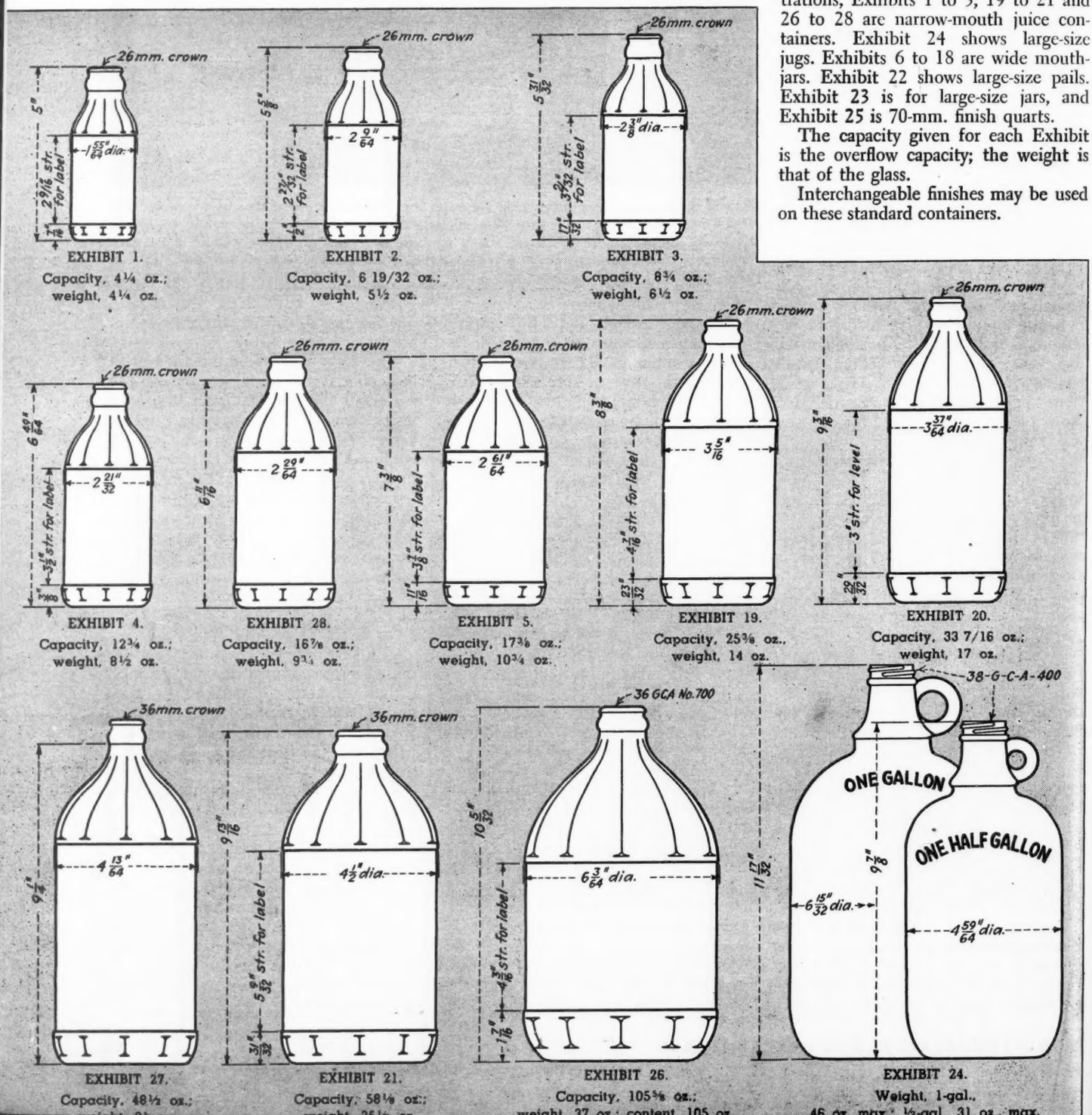
It is the plan of WPB to make the standard containers effective for various food products in the near future by issuing orders to that end. And packers are encouraged to make use of the standard sizes even before ordered to do so.

Wines, jellies and preserves have been restricted to standard containers by two new schedules to Limitation Order L-103. Previously, standard bottles had been established for malt beverages, and standardization schedules are being prepared for other food products packed in glass. The schedule for preserves sets standards for containers for jams, jellies, preserves and fruit butter.

Referring to the accompanying illustrations, Exhibits 1 to 5, 19 to 21 and 26 to 28 are narrow-mouth juice containers. Exhibit 24 shows large-size jugs. Exhibits 6 to 18 are wide mouth-jars. Exhibit 22 shows large-size pails. Exhibit 23 is for large-size jars, and Exhibit 25 is 70-mm. finish quarts.

The capacity given for each Exhibit is the overflow capacity; the weight is that of the glass.

Interchangeable finishes may be used on these standard containers.



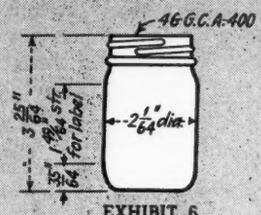


EXHIBIT 6.
Capacity, 4¼ oz.; weight, 3¾ oz.

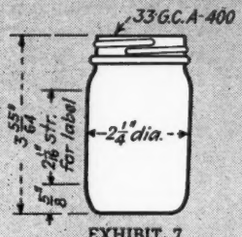


EXHIBIT 7.
Capacity, 6¼ oz.; weight, 4¼ oz.

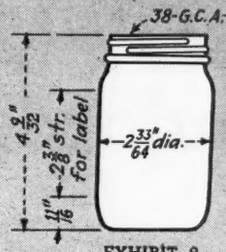


EXHIBIT 8.
Capacity, 8⅜ oz.; weight, 6 oz.

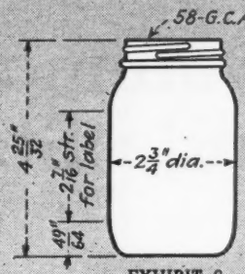


EXHIBIT 9.
Capacity, 11½ oz.; weight, 7⅛ oz.

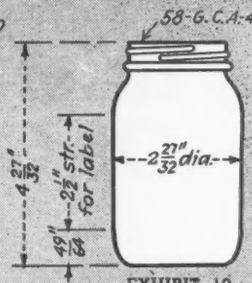


EXHIBIT 10.
Capacity, 12½ oz.; weight, 7½ oz.

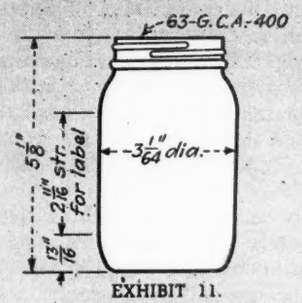


EXHIBIT 11.
Capacity, 15¼ oz.; weight, 7½ oz.

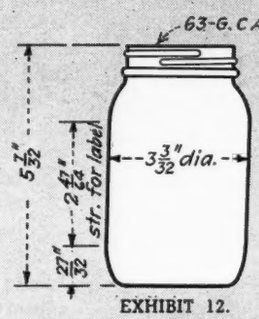


EXHIBIT 12.
Capacity, 16⅜ oz.; weight, 9 oz.

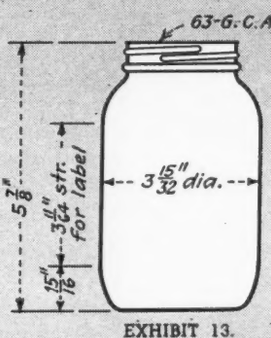


EXHIBIT 13.
Capacity, 22¾ oz.; weight, 11½ oz.

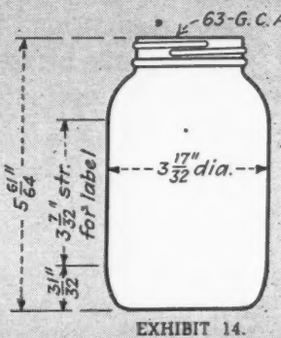


EXHIBIT 14.
Capacity, 24½ oz.; weight, 11¾ oz.

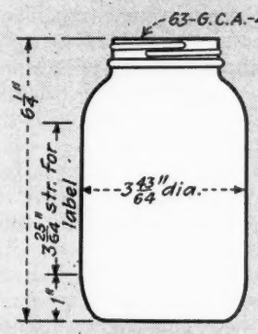


EXHIBIT 15.
Capacity, 27½ oz.; weight, 13 oz.

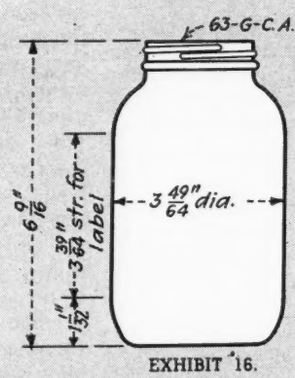


EXHIBIT 16.
Capacity, 30½ oz.; weight, 13¾ oz.

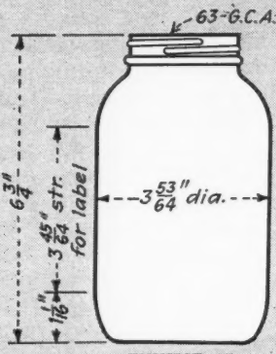


EXHIBIT 17.
Capacity, 32⅝ oz.; weight, 14 oz.

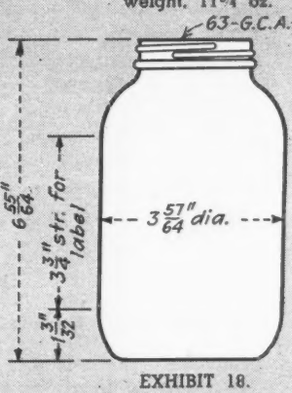
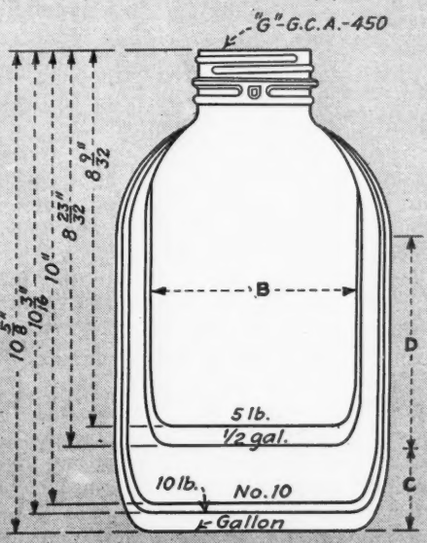
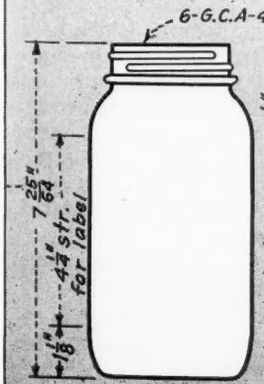


EXHIBIT 18.
Capacity, 34; weight, 14 oz.

EXHIBIT 22. (Right)

Style	Capacity	Weight	Ht.	B	C	D
5 lb.	58 oz.	24 oz.	8 9/32	4 51/64	1 1/16	4¼
10 lb.	116 oz.	38 oz.	10 3/16	6 7/64	1½	5⅛
No. 10	103 oz.	35 oz.	10	5 27/32	1½	4½
Half-gal.	66 oz.	26 oz.	8 23/32	4 63/64	1¼	4¼
Gallon	130½ oz.	44 oz.	10⅝	6⅜	1¾	4¾





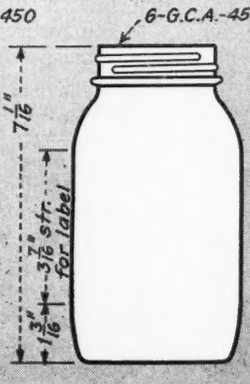


EXHIBIT 25.
70-mm. finish quarts.
Left, capacity, 32⅝ oz.; weight, 12½ oz.
Right, capacity, 32⅝ oz.; weight, 12 oz.

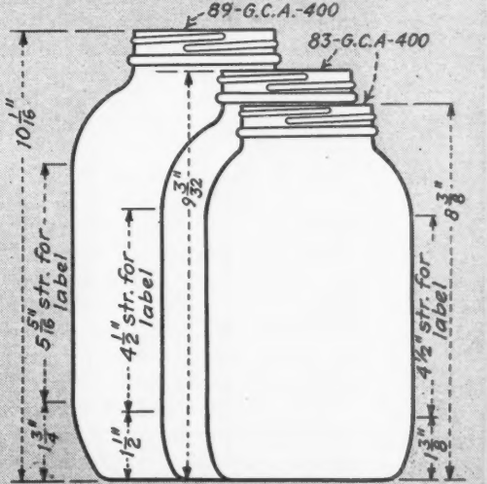


EXHIBIT 23.

Style	Capacity	Weight
Gallon	130½ oz.	40 oz.
No. 10	103⅝ oz.	33 oz.
Half-gal.	65¼ oz.	24 oz.

Brief Summaries Of Grade Standards

For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Administration

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Administration of the U. S. Department of Agriculture are prepared by FOOD INDUSTRIES. Those that follow and those which appeared in the August, September, October and November, 1941, and July, August, September and October, 1942, issues are a continuation of the series begun in 1940.

The complete text of the standards can be obtained from the AMA, located in Washington, D. C.

Frozen Lima Beans

FROZEN LIMA BEANS are the vegetable prepared from the seed of varieties of the lima beans by shelling, washing, and pre-cooking (blanching) and are frozen and stored at temperatures necessary for the preservation of the product. Types of frozen lima beans may be: thin-seeded, such as Henderson Bush variety, or thick-seeded, such as Fordhook variety.

U. S. GRADE A or U. S. FANCY frozen lima beans are lima beans of similar varietal characteristics which possess a practically uniform, good green color, are practically free from defects, are tender, possess a normal flavor and odor, and score not less than 90 points when scored in accordance with the scoring system outlined herein.

U. S. GRADE B or U. S. EXTRA STANDARD frozen lima beans are lima beans of similar varietal characteristics which possess a reasonably uniform green color, are reasonably free from defects, are fairly tender, possess a normal flavor and odor, and score not less than 80 points.

U. S. GRADE C or U. S. STANDARD frozen lima beans are lima beans of similar varietal characteristics which are fairly free from defects, are reasonably tender, possess a normal flavor and odor, may consist of all white or mixed white and green beans, and score not less than 70 points.

OFF-GRADE frozen lima beans are lima beans that fail to meet the requirements of U. S. GRADE C or U. S. STANDARD.

Federal inspection certificates covering frozen lima beans shall indicate the size or combination of sizes found upon examination. The various sizes of frozen lima beans are as follows:

No. 1 size lima beans are lima beans that will pass through a sieve containing 28/64-in. perforations.

No. 2 size lima beans are lima beans that will pass through a sieve containing 30/64-in. perforations but will not pass through a sieve containing 28/64-in. perforations.

No. 3 size lima beans are lima beans that will pass through a sieve containing 34/64-in. perforations but will not pass through a sieve containing 30/64-in. perforations.

No. 4 size lima beans are lima beans that will not pass through a sieve containing 34/64-in. perforations.

The grade of frozen lima beans is determined after complete thawing under a gentle spray of tap water at a temperature of approximately 68 deg. F. The flavor and odor of frozen lima beans is determined after cooking the lima beans in boiling water in an uncovered container. The lima beans are placed in the boiling water and the cooking time (from the time the water boils after the beans have been added) is 12 minutes for small (No. 1 and No. 2) beans and 20 minutes for large (No. 3 and No. 4) beans. "Normal flavor and odor" means that the lima beans are free from objectionable and off-flavors and odors of any kind. The grade of frozen lima beans may be ascertained by considering, in addition to other foregoing requirements, the following quality factors: Color, absence of defects, and tenderness and maturity.

"Good green" color lima beans means that not less than 50 percent of the surface area of the individual lima bean possesses as much green color as Plate 18, 1-4, in Maerz and Paul's "Dictionary of Color." "Pale green" color means that more than 50 percent of the surface area of the individual lima bean may possess less green color than Plate 18, 1-4, but not less green color than Plate 18, E-1. A "white" bean means that more than 50 percent of the surface of the individual lima bean may possess less green color than Plate 18, E-1. Spotted or otherwise discolored lima beans are considered as defective beans and, therefore, are not considered in evaluating the factor of color.

The factor of absence of defects means degree of freedom from spotted or otherwise discolored lima beans (brown or gray), broken lima beans, and from loose skins. A "broken" lima bean is one that is so damaged that a cotyledon has become separated from the bean. "Practically free from harmless extraneous vegetable material" means that there may be present not more than one piece of this material (such as a thistle bud), approximating the size of a lima bean per lb. of lima beans, or per package, if the package is less than 1 lb.

Tenderness and maturity are determined by brine flotation tests. The brine solution is based on the percentage of pure salt in solution, as determined by salometer reading immediately prior to making the tests. In making the test a 250 ml. glass beaker is filled with brine solution to a depth of two inches. The temperature of the solution and the lima beans tested should approximate room temperature. Only lima beans that sink to the bottom of the receptacle within 10 seconds after immersion are counted as "beans that sink."

When certifying samples which have been officially drawn and which represent a specific lot of frozen lima beans, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet

the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug, and Cosmetic Act.

ISSUED: June 15, 1942
EFFECTIVE: July 1, 1942

Frozen Broccoli

FROZEN BROCCOLI is prepared from the fresh, headed stalks (or shoots) of the broccoli plant by trimming, washing and precooking (blanching), and is frozen and stored at temperatures necessary for the preservation of the product.

U. S. GRADE A or U. S. FANCY frozen broccoli possesses similar varietal characteristics; is well trimmed, well formed, and practically free from defects; possesses a practically uniform typical green color; possesses a normal flavor and odor; and is of such quality with respect to uniformity of size as to score not less than 85 points when scored in accordance with the scoring system.

U. S. GRADE B or U. S. EXTRA STANDARD frozen broccoli possesses similar varietal characteristics; is well trimmed, fairly well formed, and reasonably free from defects; possesses a reasonably uniform typical green color; possesses a normal flavor and odor; and is of such quality with respect to uniformity of size as to score not less than 70 points when scored in accordance with the scoring system outlined herein.

OFF-GRADE frozen broccoli is broccoli that fails to meet the requirements of U. S. GRADE B or U. S. EXTRA STANDARD.

Frozen broccoli is graded after the broccoli has been thawed under a gentle spray of tap water at a temperature of approximately 68 deg. F. until each unit is free from ice crystals and can be handled individually. After the broccoli has been scored for uniformity of size and absence of defects, it is cooked before evaluating the factor of color. Flavor and odor also are determined after cooking. "Normal flavor and odor" means that the broccoli, after cooking, is free from objectionable off-flavors or odors of any kind.

"Diameter" means the longest measurement through the stalk, measured one inch from the butt end.

To receive a rating of 17 to 20 points the broccoli must be practically uniform in size. "Practically uniform in size" means that the diameter of the largest unit does not exceed the diameter of the smallest unit by more than ½ in., and the length of the longest unit does not exceed the length of the shortest unit by more than 1 in.

Broccoli that is reasonably uniform in size may be given a score of 14 to 16 points. "Reasonably uniform in size" means that the diameter of the largest unit does not exceed the diameter of the smallest unit by more than ¾ in., and the length of the longest unit does not exceed the length of the shortest unit by more than 2 in.

Broccoli that fails to meet the requirements of the paragraph above may be given a score of 0 to 13 points.

The factor of "absence of defects" has reference to the degree of freedom from defects of formation, such as spreading heads, flowered heads and shattered heads, as well as to freedom from grit or other foreign material, poorly trimmed units and units damaged by spots, stain, discoloration or mechanical, pathological, insect or other injury.

"Unit" means a portion of the broccoli plant including the head, stem and any attached leaves. "Head" means the combined group of bud clusters attached to a single unit. "Well trimmed" means that damaged or discolored leaves, as well as leaves of sufficient length to extend more than 1½ in. above the head, have been neatly removed from the unit, and the tough wood portion of the lower stem has been smoothly removed at approximate right angles to the longitudinal axis and the butt of the unit is not stingy and frayed. "Grit" (or sand) is rough, hard particles of earthy sediment. "Spreading heads" are heads which have loose and branching bud clusters. "Flowered heads" are heads in which the florets have reached the open or opening flowered stage. "Shattered heads" are heads that have been broken or shattered by mechanical or other means. "Damage" means any injury or defect which materially affects the appearance or edible quality of the unit.

To receive a score of 34 to 40 points, the broccoli must be well trimmed, well formed, and practically free from defects. "Well formed" means that the units have practically compact heads that are not appreciably spreading or flowered. "Practically free from defects" means that not more than 10 percent by count of the units are damaged by the defects mentioned above.

Broccoli that is well trimmed, fairly well formed and reasonably free from defects may be given a score of 28 to 33 points. "Fairly well formed" means that the units have reasonably compact heads that are not spreading or flowered to such an extent as to materially affect the appearance or edible quality. "Reasonably free from defects" means that not more than 20 percent by count of the units are damaged by the defects mentioned above. Broccoli that falls into this classification shall not be graded above U. S. GRADE B or U. S. EXTRA STANDARD, regardless of the total score for the product.

Broccoli that fails to meet the requirements of the paragraph above may be given a score of 0 to 27 points and shall not be graded above OFF-GRADE, regardless of the total score for the product.

In evaluating the factor of color, consideration is given to the presence or absence of yellow and to the absence of grey, or purity of the green color.

The color of frozen broccoli is ascertained after cooking 10 oz. of the thawed product in 16 oz. of water for exactly 5 minutes at 212 deg. F. The broccoli is placed in the boiling water in an uncovered container, and cooking time starts at the time the water boils after the broccoli is added. If the boiling point is low, one minute shall be added to the cooking time for each 2 deg. below 212 deg. F.

To receive a score of 34 to 40 points the cooked broccoli must possess a practically uniform typical green color. "Practically uniform typical green color" means that the broccoli is practically uniform in color and possesses a characteristic green color which approximates, or is better than, Plate 20, L-6, as illustrated in Maerz and Paul's "Dictionary of Color."

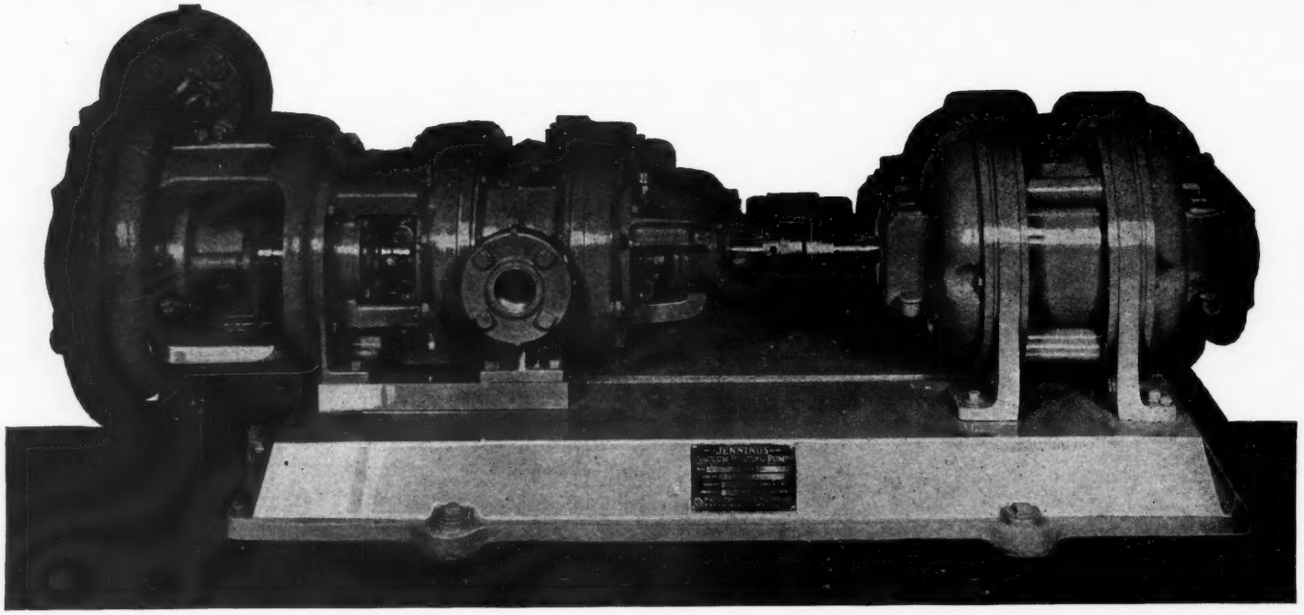
Cooked broccoli that possesses a reasonably uniform typical green color may be given a score of 28 to 33 points. "Reasonably uniform typical green color" means that the broccoli possesses a characteristic green color which may be slightly variable but in which the predominant color appears no more yellow than Plate 21, L-5, and no more grey than Plate 22, L-4. Broccoli that falls into this classification shall not be graded above U. S. GRADE B or U. S. EXTRA STANDARD, regardless of the total score for the product.

Cooked broccoli that fails to meet the requirements of the paragraph above may be given a score of 0 to 27 points and shall not be graded above OFF-GRADE, regardless of the total score for the product.

When certifying samples which have been officially drawn and which represent a specific lot of frozen broccoli, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the

(Turn to page 99)

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

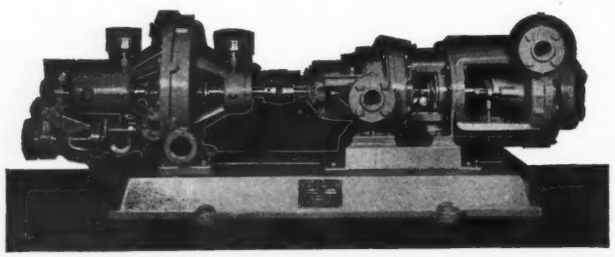


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

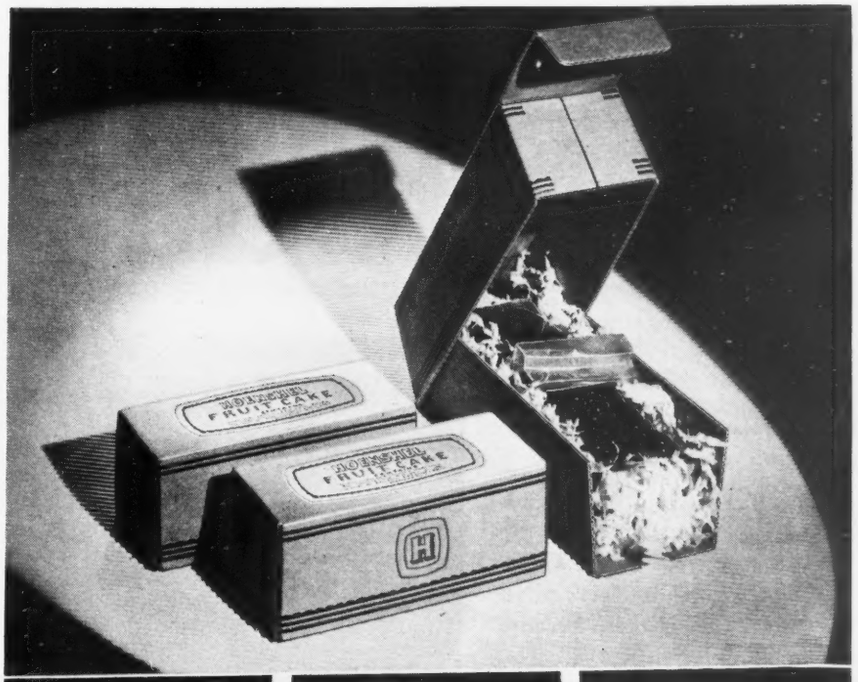
SOUTH NORWALK · CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Box Substitutes for Tin

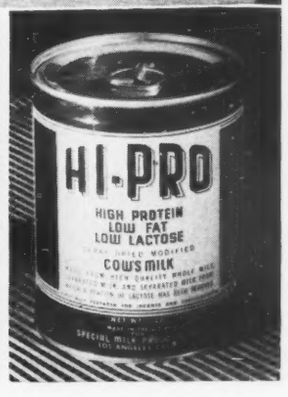
HOENSHEL FINE FOODS, Sandusky, Ohio, has adopted a special corrugated package for its cakes and puddings, which increases product protection, speeds packing and shipping, and reduces packaging costs.

The box, which replaces a tin container, is of one-piece construction, readily set up for easy packing, and no stapling or stitching is necessary. Double-thickness ends and sides provide extra rigidity and protection. The pebble-grain kraft exterior is printed in dark brown and red, and the gold-color label is printed in red and brown. The new corrugated container costs 65 percent less than packages formerly used. In 1-, 1½-, 2- and 3-lb. sizes, it is now used for marketing Hoenshel fruit cake, plum pudding, fig pudding, fig and date pudding, fruit cake and sauce, and plum pudding and sauce.



Dehydrated Chicken Dinner

DEHYDRATED foods have progressed to the point that an entire "chicken dinner" is offered to consumers by Barlow Food Products Co., St. Joseph, Mo. "Chicken Shack Dinner Mix" contains pure egg noodles, chicken fat, cereal flour, dry skim milk, salt, dehydrated vegetables, artificial flavor (wheat protein derivative) and turmeric. The 3½-oz. heavy coated paper bag contains the noodles and a waxed envelope with the other ingredients, which are cooked separately. This Chicken Shack sauce may also be used as a gravy for dumplings or meats.



New Use for Paper Bags

ENTERPRISING manufacturers continue to find new ways of packaging old products to save strategic materials. The first carload of sweet potatoes ever to be shipped in paper bags has been delivered to a supermarket by F. H. DeZauche and Son, Opelousas, La. Not a single one of the 520 bags in the shipment was broken.

The carload of sweet potatoes was inspected on arrival by Department of Agriculture officials, who reported the contents in excellent condition after six days in transit. Fifty-pound multi-wall paper bags were used for the shipment.

These less-expensive, light-weight containers were developed and specially constructed for sweet potatoes by Union Bag and Paper Corp., New York. Their use should profit the grower through reduced freight costs, and the saving can be passed on to consumers. The new bag is not likely to be affected in the drive for war materials.

High-Protein Milk

IT is now possible to buy canned, dried milk from which a portion of lactose has been removed. "Hi-Pro" milk, marketed in a 1-lb. container by Special Milk Products, Inc., Los Angeles, is a spray dried modified milk, high in protein value but low in fat and lactose.

Hi-Pro is made from high quality whole milk, separated milk and a partially delactosed separated milk. It is recommended for infant and convalescent feeding on prescription of a doctor. A formula can be prepared from the product by placing the desired amount of Hi-Pro and warm boiled water in a pint or quart size mason jar or milk bottle, shaking until the mixture is dissolved.

Come and Get It

CANNED ham and eggs is now processed in large quantities for the armed forces by H. J. Heinz Co., Pittsburgh, and other food concerns. A product that has never been available to housewives, the new breakfast ration is another tribute to the work of the Army Quartermaster Corps.

Long before the war began, experts at the Chicago Quartermaster Depot Research Laboratory were experimenting with the preparation of canned rations, with flavor as well as nutritive value, that would furnish the armed forces with balanced diets. In the Heinz experimental kitchens, the company's technologists worked with the Quartermaster Corps to devise a formula for an egg product that would be high in protein. As a result, men in the services will now have canned "chopped ham and eggs" that is appetizing and nutritive as well as a familiar breakfast dish.

that can wasn't "planted"!

No specially posed advertising illustration is this picture!

It's an official Army photograph . . . straight from the files of the United States Army Signal Corps (SC-130812 to be precise) . . . and that Crown Can is there because it's actually in service!

When Crown wanted a picture to show a water purification unit of the U. S. Engineers in actual operation the Signal Corps supplied this picture. We did not tell the Army for which of our customers we wanted to use the photograph. It was our original intention only to use the picture as a background . . . and say that Sanitation HTH, the product of our customer, the Mathiesen Alkali Works, Inc., of New York, was used by the Army in many of these units.

But when we got the print, there was a Crown Can holding Sanitation HTH, sitting on a rock with the trademark perfectly legible!

Just goes to show that you'll meet up with Crown Cans in lots of places the Army and Navy go in wartime!

CROWN CAN COMPANY, PHILADELPHIA, PA., *Division of Crown Cork and Seal Company*

PHOTO BY U. S. ARMY SIGNAL CORPS

CROWN CAN ★ ★ ★ ★ ★

FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • MEN • JOBS • COMPANIES • NOVEMBER, 1942

Price Control Extended To 90 Percent of Foods

OPA ceilings bring additional 30 percent of foods under maximum prices; some seasonal foods exempted

PRICE ceilings for more than 90 percent of the nation's food budget went into effect on October 5, bringing an additional 30 percent of food products under maximum price regulation. Immediately following enactment of the Brown-Wagner price control bill, Leon Henderson announced a 60-day temporary price ceiling covering practically all products formerly exempted from OPA decree, using prices of September 28-October 2 as a base.

Some seasonal foods were for the moment exempted from price control: Fresh fruits and vegetables (except potatoes, dry onions and citrus fruits), fresh fish and peanuts. However, these foods may be affected in the permanent OPA regulations now being drafted from the 60-day emergency order.

Other OPA Orders

In its routine price-control work last month, the OPA slapped ceiling prices on beef to limit the price that slaughterers and wholesalers may charge for the dressed product. Top price which any packer or wholesaler may now charge for choice or Grade AA steers and heifers is 23 cents per pound, regardless of his previous individual ceilings.

Price increases on dried fruits was given the official nod in an OPA regulation which affects apricots, peaches, pears, prunes, figs and raisins. California wine price inequities rising out of the general price freeze last May were tentatively removed by an OPA notice to vintners promising permission to increase the present March, 1942, ceiling prices on sweet and dry wine sales to bottlers. Maximum prices for 45 imported spices and spice seeds relieved grinders and packers from a squeeze between high costs and low resale prices, but the order did not affect retail price ceilings. An amendment on canned shrimp prices rescinded the original maximum price regulation, lifting ceiling levels on both wet and dry pack by 17 to 27 percent per can at the packer level. Dried eggs were temporarily placed under price control at the highest levels at which distributors did business during the September 28-October 2 base period.

In a move to rectify a hardship imposed on domestic rice millers because of war dislocations of shipping, OPA now permits maximum export prices for domestic milled rice to be calculated by the addition of transportation charges from the applicable base point to the port from which the shipment is made. So that retail distributors of fresh grapefruit could set ceilings for their product —which was not marketed generally during the September 28-October 2 base period of the recent 60-day temporary freeze order on citrus fruits—OPA announced an additional method for pricing the product. Retailers thus affected must use as their ceiling price 10 cents per grapefruit, or the retailer's cost plus 2½ cents, whichever is lower. Importers of Cuban pineapple and pineapple juice who did not purchase these products in November 1941, or March 1942, were asked to use as their ceiling price the maximum figure of their most closely competitive seller and importer. OPA also announced complete details of the regulation by which apple processors may increase maximum prices for canned apples, applesauce, apple juice, cider and dried apples. Uniform methods of computing maximum lard prices at the processor level were established on October 7.

FRC Sets 1943 Goals For Winter Vegetables

PRODUCTION goals for the 1943 crop of winter vegetables have been announced by the Food Requirements Committee. The goals are so proportioned as to increase the output of vegetables of most value in the wartime diet and reduce the acreage of the less essential crops. The winter vegetables covered in these goals are produced chiefly in California, Texas, Florida, South Carolina, North Carolina, Georgia, Arizona, Louisiana, Alabama, and Mississippi.

The 1942 acreages of vegetables in the ten states, and the approximate percentage of increase requested for 1943 follow: Carrots—38,400 acres, 30 percent; lima beans—9,600 acres, 25 percent; snap beans—109,150 acres, 15 percent; onions—65,600 acres, 15 percent.

The 1942 acreages of the vegetables for which production is requested at about the same level include: Green peas, 44,900 acres; cabbage, 86,500 acres; fresh tomatoes, 138,100 acres; beets, 9,150 acres; spinach, 48,750 acres.

There Will Be Enough Cans

THERE will be enough containers to take care of the 1943 packs of canned beets, carrots and spinach, the WPB has assured the industry. This announcement was made to permit canners to contract for their crop requirements.

NEW USE FOR PEANUTS

Experiments are being conducted at the Southern Regional Research Laboratory, at New Orleans, in the use of peanut oil as a substitute for palm oil in manufacturing tinplate. The laboratory is endeavoring to treat the peanut oil in such a way as to impart to it the properties naturally found in palm oil, which is used to blanket molten tin to keep the air away while tinplate is made. Peanuts are plentiful in the United States, while palm oil has been imported to the extent of $30,000,000 worth annually from the East Indies. The picture shows B. A. Smith shelling the peanuts for laboratory experiments.

Alternate Price Plan Announced

Established by Henderson to relieve the "squeeze" on food wholesalers and retailers

Food retailers and wholesalers severely squeezed under OPA's March price ceiling can now restock hundreds of individual items in 11 broad groups of food products. Leon Henderson's new alternative pricing order, announced October 9, is the first of three types of food regulations on which OPA has been working since last summer. First indication of the new orders came on October 3 when Henderson froze the price of butter, eggs, poultry, canned milk, flour, potatoes and other key foods. The second regulation will permit specific price increases on some new-pack canned foods (other than vegetables), and the third order will cover highly seasonal items such as maple sirup, apple cider and holiday candies.

The following groups of foods are affected by the alternate price order, which became effective October 15: Breakfast cereals, canned fish, cooking and salad oils, sugar, canned vegetables, coffee, rice, hydrogenated shortening, other shortening, dried fruits and lard. On nine of these food groups the option of taking a new ceiling price obtained by using the alternate pricing method, or of retaining his March ceiling price, rests with the wholesaler or retailer. On dried fruits (including prunes) and lard, the new ceilings must be used.

The two regulations of the alternate pricing plan are the Maximum Price Regulation No. 237 (Adjusted and Fixed Mark-Up Regulation for Sales of Certain Food Products at Wholesale) and Maximum Price Regulation No. 238 (Adjusted and Fixed Mark-Up Regulation for Sales of Certain Food Products at Retail). The regulations divide sellers of the 11 groups of food products into three classes for wholesalers and five classes for retailers.

Each class is given a mark-up over net cost for each group of foods, resulting in a new ceiling price for each item. Except for dried fruits and lard, the new ceiling is optional for the other nine groups, depending on whether it comes out higher than the seller's own March ceiling.

Use of Sugar in Bulk Condensed Milk Cut

Under a recent ruling by the OPA, sugar will be allotted for "bulk" packaged condensed milk only if the milk so processed cannot be preserved by manufacture into other essential food products such as butter, cheese and milk powder. This ruling does not apply to condensed milk packaged in 1-gal. or smaller containers.

WORKS ON FOOD ORDER

Lee Marshall, of Continental Baking Co., New York, recently has been working on an executive order that would take control of food from Secretary of Agriculture Wickard and put it back into the hands of Donald Nelson's WPB. Mr. Marshall, it has been said, is under consideration for the post of Food Administrator, if and when such a post is created.

Standards for Frozen Snap Beans Issued

Tentative Federal standards for grades of frozen snap beans have been issued by the Agricultural Marketing Administration, effective as of October 1. The AMA has also announced revision of the Federal standards for grades of dried apples, which became effective September 1. The minor changes embodied in the new draft are intended to clarify certain provisions and make them more easily applied by the trade.

Government Subsidizes Handling of Milk

Upon the recommendation of the OPA, the Department of Agriculture is subsidizing milk handlers in the New York metropolitan milk marketing area. The purpose is to maintain present ceiling prices while still allowing the dairy farmers a higher price. Under this program, which has been approved by the President, Commodity Credit Corp. will buy fluid milk at $3.30 from the handlers and then sell it back to them at $3.10. The added funds will be distributed to dairy farmers as part of the monthly uniform price.

This subsidy will ease the "squeeze" on the dairy companies, which are reported to have been losing $750,000 a month.

U. S. Wants More Frozen Foods

Armed forces will take 70.9 million pounds of vegetables next year, if available

Large quantities of frozen foods are being consumed by the Army, and the government is taking steps which may lead to expansion of the capacity of the freezing industry. Purchases of frozen foods for the armed forces have been at the rate of 600,000 lb. of fruits and vegetables a month. And the total requirements of frozen vegetables for the Army, Navy and other armed services for 1943 is put at 70.9 million pounds, of which the Army wants 53 million. By commodities the total military demand for frozen vegetables in 1943 is as follows: lima beans, 13,400,000 lb.; snap beans, 8,000,000 lb.; sweet corn, 5,400,000 lb.; peas, 30,700,000 lb.; and spinach, 13,400,000 lb.

Frozen vegetables other than those listed will be considered by the armed forces if available in sufficient quantities. As to package sizes, the Army prefers 2½- and 5-lb. containers.

Prompted principally by the need to save tin and steel in packaging foods, the Army's consumption of frozen foods will be limited to the continental United States, thereby releasing large quantities of canned foods for shipment abroad.

Steps leading to expansion of the frozen foods industry might be taken by the government as a result of a recent survey by the WPB of the capacity of the industry. At least the industry is almost certainly assured of high priorities for its maintenance and repair requirements.

Freezing Before Packing To Aid Peach Canners

At the Western Regional Research Laboratory of the Department of Agriculture, there has been developed a method of freezing fresh peaches to hold them for subsequent canning operations. Such a method will avoid heavy peak loads on the cannery and eliminate some of the spoilage that occurs.

At the proper stage of maturity, the fruit is picked and placed in freezing storage. Then the canner takes the frozen fruit from storage as needed and peels it before defrosting. Freestone peaches can be peeled by exposure to steam for ten seconds, and cling peaches can be peeled with acid or lye in 45 to 90 seconds. The peaches are then defrosted by exposure to live steam or by boiling. Then they are cooled and are ready for slicing.

Two Dehydration Schools Held

Intensive two-week training given at Albany, Calif., and Rochester, N. Y.

COMMANDO training could not be any more intensive than the instruction received by dehydrater operators at two schools held this fall. Into two weeks of study was compressed all the information in existence that would be of value to companies engaged in dehydrating vegetables on government contracts.

The first of the schools was held at the Western Regional Research Laboratory, U. S. Department of Agriculture, Albany, Calif., September 21 to October 3. The other was at the Rochester, N. Y., plant of Beech-Nut Packing Co., October 19 to 31. Attendance at the schools was limited to about 100 invited persons at each session, divided into study groups of 25, each duplicating the work of the others. "Pupils" were company chemists, production managers, consulting engineers, and a few presidents for good measure. There were gray heads, bald heads and young men. Discussion and debate with the lecturers were encouraged. When one lecturer at the Albany school observed that "this sort of a box for packaging will cost you about 24 cents," a pupil who was at least 20 years older rejoined: "We have never been able to buy boxes of that specification for less than 30 cents."

Under the direction of H. C. Diehl (who is now dubbed "Chancellor" Diehl), the formal instruction at Albany covered varieties of vegetables, handling and storage, principles of dehydration, preparation, plant sanitation, auxiliary equipment, processing costs, labor requirements, dry storage, fruit dehydration, spray drying, packaging materials, microscopy, pilot plant operation, rigid metal containers, replacement containers, insect control, rehydration, grades and specifications. There were also luncheon speakers on several occasions, including Dr. S. C. Prescott, Col. Paul P. Logan, Q.M.C., Dr. Agnes Fay Morgan and Dr. L. V. Burton.

Corn Canners Seek Solution to Problems

IN an effort to get a workable solution to problems arising out of WPB Order M-237 restricting shipments of canned foods, a conference sponsored by Corn Canners' Service Bureau was held in Chicago, October 13 and 14.

Out of the meeting came two resolutions. One seeks permission for canners to move stocks out of unheated warehouses before winter sets in, even though those shipments during a 6-month period may exceed 35 percent of the canners' pack in that group for the year.

The second seeks permission for distributors, brokers and wholesalers to accept and take title to shipments from the canners' unheated-warehouse stocks.

How to meet the growing labor shortage for 1943 came in for much discussion in connection with a talk made by Walter Erb, Regional Farm Placement Representative, U. S. Employment Service, Chicago, Ill. The problem is as serious in connection with inspection for government buying as it is with actual production operations.

Food Processors To Meet in December

CANNERS, dehydrators, freezers and preservers will meet in Chicago in December, probably the week of the 13th. At this conference the processors are expected to hear from government men facts that will enable them to make definite plans for 1943 operations under the war program and regulations now being formulated. Because of this meeting, the canners' convention will not be held in January. Plans for the conference have been made by National Canners Association.

Wheat Acreage To Be Cut

WHEAT GROWERS have been urged by the Department of Agriculture to divert as much wheat acreage as they can to crops more needed in the war program. The following crops are designated as especially important: Flaxseed, dry beans, dry peas, cover crop seed, sugar beets, cotton, hemp, peanuts for oil, soybeans for beans, castor beans, and certain feed grain crops.

Domestic Meat Sales Limited

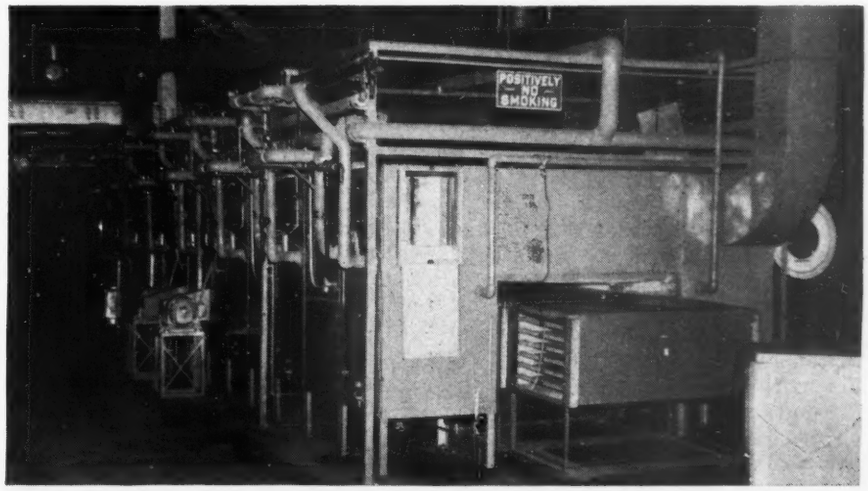
OPA establishes quotas for sale of meat to civilians to insure Army supply

RESTRICTIONS on meat sales went into effect on October 1 with OPA's dictum specifying quotas of beef, pork, veal, mutton and lamb that could be distributed for civilian use. Sales to the civilian trade in the final quarter of 1942 were limited to the following percentages of deliveries in the same period of 1941: Beef, 80 percent; veal, 100 percent; lamb and mutton, 95 percent; and pork, 75 percent. This applies only to deliveries by packers who slaughter more than 500,000 lb. in a quarter.

The canner and cutter beef quota to the domestic trade in the last quarter of 1942 is limited to 20 percent of the 1941 quarter base quota for Federally inspected plants and 25 percent for non-Federally inspected plants.

Limitation figures for the last three months of 1942 indicate an overall reduction of 21 percent below the amount of beef, veal, pork, lamb and mutton available in the last quarter of 1941. However, in actual operation, the order may not result in so great a cut, since adjustments will be made to allow for changes in the past year in distribution and the wartime food requirements of different areas.

The new Restriction Order No. 1 does not apply to lard or such products as liver, hearts and kidneys. Canned meat, sausage, scrapple and like products are not subject to quota restrictions but are affected because the meat used in their manufacture is subject to such restrictions.



EXPERIMENTAL DEHYDRATER

This large experimental dryer at the Western Regional Research Laboratory is designed for research work and can be operated as a tunnel, as a cabinet, or as a series of cabinets, each with different temperature and humidity conditions.

Poultry Industry Gears for Job

Considers ways and means of handling record poultry crop and heavy wartime demand

FACED with a record poultry crop and a heavy wartime demand for poultry products, members of National Poultry, Butter and Egg Association met in their 36th annual meeting at Chicago, Ill., September 27-29, to consider ways and means of meeting poultry processing and handling problems.

In the face of labor shortages, priority restrictions on plant expansions and equipment, and scarcity of repair and replacement parts, handling and processing of the record-breaking poultry crop presents serious problems.

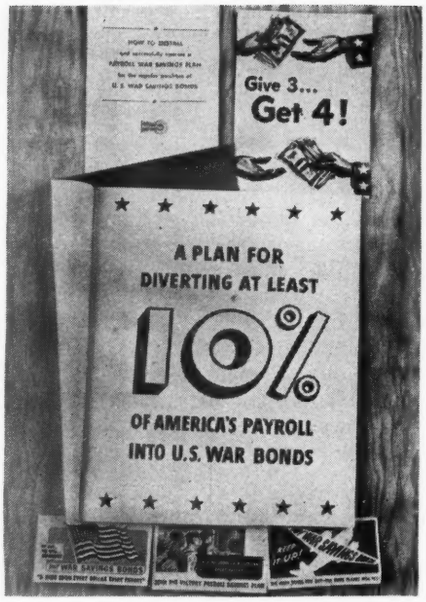
Practical pointers on these problems were given by Harry E. Drews. His advice on ways and means of coping with the existing conditions are:

1. Continue to operate existing equipment on a heavy schedule and do as much rationing of poultry flow to market as is possible.
2. Use second-shift operating crews where available.
3. Where possible, add new or additional production units and controls to increase the production capacity of existing equipment. Utilize variable speed drives, modern waxes and scald speedups. Put all shackles and other handling equipment into usable condition and see that a systematic repair and maintenance program is followed to keep production equipment in usable condition. Too few operators take care of their equipment, particularly of their shackles. Careless and indifferent lubrication is the cause of much equipment trouble.
4. Where possible, make additions to established plants. But with the industry operating on an A-10, P-100 rating, new up-to-date equipment will not be obtainable on that basis. At best new equipment is scarce and very difficult to obtain. Indications are that the poultry industry may be classed along with the dairy group for priority purposes and be governed by the dairy industry priority rulings.

Up-to-date installations will cut labor to one-third that previously used, it was pointed out. Defeathering wax is becoming hard to get, so existing supplies should be used more efficiently than is often done and adequate stocks should be kept, without hoarding. Replacement supplies should be ordered well in advance, but only in the quantities actually needed.

Efforts are being made to standardize on one box package for chickens and two box sizes for turkeys. Wood and nails for egg cases are critical materials. Wire-bound boxes are likely to be out of consideration.

The association reelected all of its officers.



YOU SHOULD HAVE THIS

If you don't yet have it, you should obtain the set of Payroll Savings Plan promotional material made available by the Treasury Department. This material will help your plant to reach the 10 percent goal.

Reveal New Facts About Fats, Oils

Chemists report new technical discoveries at AOCS fall meeting in Chicago

ALTERNATES for salad oils, effectiveness of fatty acid monoesters as antioxidants for fats and oils, relative linoleic acid radical content of various shortenings and available supplies of fats and oils were among the subjects discussed at the 16th fall meeting of the American Oil Chemists' Society in Chicago, October 8 and 9.

In their work on fat-soluble monoesters of *l*-ascorbic acid and *d*-isoascorbic acid and their uses, R. W. Riemenschneider and associates of the U. S. Eastern Regional Research Laboratory, Philadelphia, Pa., have shown that the stability of prime steam lard can be increased 6 to 10 fold by the addition of 0.06 percent of these esters, together with 0.03 percent soya lecithin. Also that these esters can be prepared fairly pure at a yield of 70 to 80 percent.

Upon studying various shortenings to determine the effect of hydrogenation upon the linoleic acid radical content of vegetable oils in comparison with that of other edible fats and oils, J. T. R. Andrews and A. S. Richardson of Procter & Gamble Co., Ivorydale, Ohio, made some surprising discoveries. The results of their study establish the falsity of the general impression that hydrogenated shortenings contain no glycerides of fatty acids less saturated than oleic.

In all, 227 samples of edible fats were analyzed for percentage of glyceride content derived from linoleic acid. The results show that butter averaged the least with 3.3 percent of linoleic acid and that vegetable oils hydrogenated to less than 100 percent averaged the most with 22.0 percent. Mixed animal and vegetable fats averaged second highest with 20.6 percent. Vegetable fats of 100 percent hydrogenation averaged 12.6 percent. Lard averaged 11.7 percent and margarine was second lowest with a 10.9 percent average.

Meat Packers Study Outlook

Supply of livestock plentiful and packing plant capacity is considered adequate

JUDGED from the attendance at general meeting sessions, labor supply and rationing plans were subjects of greatest interest to members of the American Meat Institute at their annual meeting in Chicago, October 5 and 6. Standing room only remained when Major General Lewis B. Hershey, director of the selective service system, talked about trends in selective service on an off-the-record basis and when Harold B. Rowe, director, Food Rationing Division, OPA discussed problems in wartime control of meat distribution. Registered attendance at the meeting was approximately the same as last year, an all-time high.

In his review of meat packing industry's conversion during the past year from a national defense to an actual war program, George A. Schmidt, Chairman of the American Meat Institute board, estimated that the total 1942 meat production will be about 16 percent greater than during 1941. Pork production is expected to be about 21 percent greater, the largest production on record and about 40 percent greater than the 10-year average prior to 1941. Beef suppliers are expected to be 13 percent greater than in 1941 with veal 6 percent and lamb 3 percent greater. In spite of the upward movement in production, the overall domestic consumption of meat is slightly downward. Of the total 1942 meat production, about 16 percent is being bought for the armed forces or for Lease-Lend shipments abroad. During 1943, government meat purchases are expected to be about 30 percent of the total production of 7,000,000,000 lb. and civilian per capita consumption is expected to drop from about 143 lb. to about 137 lb.

In summing up the meat packing in-

SCHEDULE OF EVENTS

NOVEMBER

5– 6—Packaging Institute, annual meeting, Hotel New Yorker, New York, N. Y.
9–10—Bakery Sales Association, Drake Hotel, Chicago, Ill.
9–21—Siebel Institute of Technology, 69th annual course in fancy cake and pastry baking and decorating, Chicago, Ill.
10–11—American Management Association, Production Conference, Hotel New Yorker, New York, N. Y.
18–20—Grocery Manufacturers of America, Inc., Waldorf-Astoria Hotel, New York, N. Y.
19–20—Thirteenth annual Dairy Inspectors School, Kansas State College, Manhattan, Kan.
24–29—American Chemical Society, 2nd National Chemical Exposition, Hotel Sherman, Chicago, Ill.
30–Dec. 4—National Exposition of Power and Mechanical Engineering, Madison Square Garden, New York, N. Y.

DECEMBER

2—National Dairy Council, annual meeting, Palmer House, Chicago, Ill.
15–20—National Child Health and Welfare Exposition, Madison Square Garden, New York, N. Y.
28–30—Society of American Bacteriologists, annual meeting, Deshler-Wallick Hotel, Columbus, Ohio.

dustry's plans and facilities for handling and processing the increased meat crop, Chairman Schmidt estimates that only 56,000 tons of steel is needed to put the industry on a maximum efficiency basis. Priority difficulties make this steel unobtainable at the present, but the future brightens with the substantial upward changes in ratings resulting from negotiations with WPB officials.

C. H. Harlan, statistician, Bureau of Agricultural Economics, reported that packing plant facilities are adequate if the marketing of the live hogs were made on an evenly distributed weekly basis for the October through January period. Otherwise the slaughter capacity in the North Central States will be overtaxed during peak weeks. Skilled labor supply appears short in numerous instances for more than one-shift per day operation.

War Makes Changes in Canada's Food Output

WHEAT acreage has been reduced in Canada by 8,000,000 acres in the past two years, it has been revealed by Minister of Agriculture James G. Gardiner. But because of improved methods and favorable weather, the wheat yield will be the highest in Canada's history—615,000,000 bu.

Other changes in Canada's food supply include an increase in the acreage of coarse grains by 5,500,000 acres, bringing production close to a billion bushels, a more than 100 percent increase in hog production, a 20 percent increase in beef production and a 60 percent increase in cheese production.

Synchronized Packaging
in VICKS Cough Drop Plant

Our model FA machines enclose each package of Vicks Cough Drops in a firmly-sealed moisture-proof cellophane wrap.

Among the newer plants, completed before the war, Vicks Cough Drop factory is an outstanding example of a foresighted and carefully planned production set-up.

A user of our machines for many years, the Vick Chemical Company installed our wrappers and bundlers in its modern manufacturing layout.

● Filled cartons are conveyed automatically to the wrapping machines which wrap each carton in moisture-proof cellophane.

● From the wrapping machines the cartons pass along to hand packers who place them in display containers.

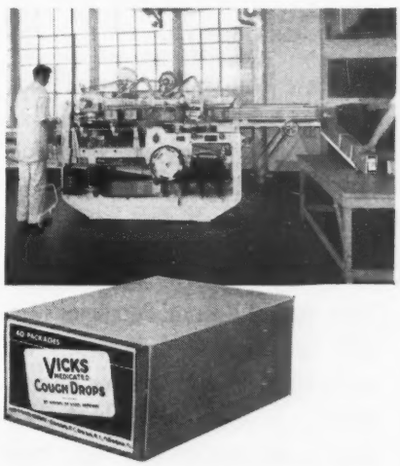
● After being filled, the containers are automatically conveyed to the girls who close them. They then travel to the wrapping machines which wrap each container, first in moisture-proof cellophane and then in heat-sealed waxed paper.

● After being wrapped, display containers go to the bundling machines which bundle *two* containers in strong kraft paper with end-seals. (Two different designs are used for the containers, and the unit of sale to the dealer is two containers, one of each design.)

A forward-looking policy of modernization is standing the Vick Chemical Company in good stead during these difficult war days. . . . Might it not pay you equally well to plan *now* for new advantages which can be fully realized when machines are again available? We're ready to study your problems now.

Consult our nearest office

Two model FA machines are used here—one to enclose the display carton in moisture-proof cellophane and the other to seal it in waxed paper.



Display containers are finally bundled on one of our model F bundling machines—two to a bundle . . . Machine bundling makes large savings in the cost of cardboard containers; also saves labor. Shipping costs are reduced, too, because the paper used for bundling weighs so much less than cardboard.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS
NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

This is REAL Conservation

WINDOW CONTAINER APPROVED BY WPB For Food Products

Transparent packaging materials are essential to the war effort. Window cartons permit full visibility (and saleability), but use a minimum of transparent material.

The new WPB ruling permits food packages with windows to replace all-transparent bags. Illustrated is an example of the remarkable saving in vital materials obtained through the use of window packages.

Your nearest Rossotti Packaging Man will be happy to demonstrate the many advantages of window cartons. Feel free to call in this packaging expert on any problem you might have involving cartons, labels, or wraps. No obligation, of course.

Rossotti Lithographing Co., Inc.
North Bergen, N. J.

SALES OFFICES IN PRINCIPAL CITIES

Rossotti

Specialists in Food Packaging since 1898

Branch Plant — San Francisco

War Production Board Orders

Production Requirements Plan—WPB has mailed Production Requirements Plan application forms (PD-25A) for the first quarter of 1943 to all manufacturers. The Requirements committee has found it necessary to cut back the amounts requested by direct war contractors to some extent, and to cut some nonmilitary requests considerably. WPB has asked all companies to make adjustments in their fourth-quarter schedules to get the most out of the materials authorized on their PRP certificates. If parts manufacturers find that they will be unable to make the quantity of finished parts they had expected to make, they should immediately inform their customers so that arrangements can be made to maintain the highest possible balanced end-product production.

Spice Quotas—An Amendment to Conservation Order M-127, issued Sept. 25, revises imported spice quotas, alloting a larger supply of the spices, in some cases, to packers, wholesalers and manufacturers, and limiting the supply of others. Quotas are placed on a quarterly basis instead of the previous monthly basis and the quota control is extended to retailers, restaurants and manufacturers who were exempt in the original order because their 1941 use of spices averaged less than 50 lb. a month. Packers' deliveries to other packers or to bulk dealers are exempt from quota regulations.

Fats and Oils—To permit building of a reserve supply of fats and oils, vital to war materials, WPB on Sept. 22 issued a revision of Order M-71, limiting their use. Fats and oils used in the manufacture of edible finished products, such as shortening, mayonnaise, salad dressing and the like, are limited to 90 percent of the amount used, by quarters, of the average of the corresponding quarters of 1940 and 1941. Special exception is made for margarine, which is given a quota of 110 percent, and vegetable oil foods which may be used up to 119 percent of the base period consumption. A blanket exemption is granted to all manufacturers using less than 6,000 lb. of fats and oils in a quarter. The new limiting order does not affect cocoa butter, butter, wool greases, essential oils, mineral oil, vitamin-bearing oil and some others.

Salmon—Twenty percent of the total salmon pack between March 1 and Oct. 31 was released for civilian consumption in Supplementary Order M-86-d isssued Sept. 30. Government requirements call for at least 60 percent of each canners' pack of steelhead, chinook, silver, red, pink and chum salmon. In order to release any salmon for civilian consumption, the canner must have delivered 60 percent of his pack to the government. The remaining 20 percent is to be held by the canner for further WPB orders.

Allocating Pilchard Catch—Machinery to allocate the pilchard catch (sardines) among canners or other processors at San Francisco, Monterey and Los Angeles Harbor was set up in Amendment No. 1 to Order M-206, issued Sept. 30. From that date, vessel operators, canners and other processors were required to make delivery of raw pilchards only in conformity with WPB regulations. Heavy deliveries at one city and a consequent short pack in another city will be avoided with WPB allocating the supply of pilchards and directing the time, manner and quantities that vessel owners may deliver to canners who are located on the Pacific Coast.

Green Coffee—Deliveries of green coffee were further restricted in Amendment No. 4 to Conservation Order M-135, issued Sept. 16. The amendment provides that no person shall deliver green coffee to any roaster and no roaster shall except such delivery, if the roaster's inventory of green and roasted coffee is, or by the addition would be, in excess of a three month's supply.

Blackplate—An amended version of Order M-104, issued Sept. 28, makes it clear that blackplate rejects are subject to quota restrictions. Allocation for the fourth quarter to crown manufacturers of blackplate rejects has already been made but the amendment emphasizes that this allocation is subject to the quota restriction contained in M-104. Blackplate is defined as any sheet steel, other than tinplate or terneplate, which is suitable for production of closures.

Dairy Equipment—Preference Rating P-118 which assigns preference ratings to processors of dairy products for their maintenance, repair, operating and replacement materials, has been extended for 90 days to December 31, in Amendment No. 3 to the order, issued Sept. 29. An A-1-j for maintenance and repair needs and an A-3 for operating and replacement needs of dairy processors were assigned in the original order.

Priorities Regulations—Several amendments have been made to Priorities Regulations Nos. 3, 11, and 12, governing the extension and use of ratings by companies under the PRP, and reratings, issued on Oct. 3. The amendment to Regulation No. 3 provides a more flexible procedure for extension of preference ratings to obtain supplies by companies *not* under the Production Requirements Plan. A corresponding amendment has been made in Regulation No. 12. The former restriction, which allowed the extension of ratings only for such operating supplies as would be actually consumed in processing production materials to which the same ratings were applied, is removed. A person who is not a PRP unit may extend ratings for operating supplies in any month up to 10 percent of the cost of production materials to which the same ratings are extended during the month. The amendment to Regulation No. 11 gives companies operating under PRP the privilege of extending ratings served on them instead of using the ratings assigned on their PRP certificates to obtain materials which are not included in the materials list accompaning the PRP application.

CAN SCRAP SALVAGED

Scrap steel and tin from can manufacture. This is one of the largest sources of tin and steel scrap. Can Manufacturers Institute reports that trimmings and clippings from the approximately 13 billion cans being made this year are rushed to detinning plants. It is estimated that between 5,000 and 6,000 tons of pure tin will be recovered this year, about 15 percent of America's requirements. In addition the cans will yield nearly 500,000 tons of steel.

Canned Foods Quotas Fixed

WPB Order M-237 restricts the deliveries of canned foods for civilian consumption

THE coming rationing of canned foods for civilian consumption was forecast in WPB's Conservation Order M-237, issued September 26, which marks the first government-established control over the civilian supply of a large number of canned fruits, vegetables, and fruit and vegetable juices. The order, which places quotas on canners' deliveries of specified foods after military and Lease-Lend requirements are met, will spread the supply more equitably among the wholesale and retail distributors and provide more equal distribution to consumers in all parts of the country. However, National Canners Association has objected to some of the regulations of the new order and its amendment is expected.

No restrictions were placed on jellies, jams, marmalades, preserves, pickles, relishes, soups or packed foods for infants and invalids. Order M-237 applies to all packs remaining in canners' hands after they have set aside for the government the percentages fixed in Supplementary Order M-86-a of June 27.

Order M-237 establishes several quota periods for canners' deliveries.

6 WAYS

to Meet Quality Standards in Stepping Up War Output

Have war demands for canned vegetables, fruits, meat, fish and dairy products increased your output by leaps and bounds? If so, then your sanitation and maintenance work must be performed in less time, with less man-power. Particularly cleaning! So PLAY SAFE . . . meet today's exacting QUALITY CONTROL standards more easily and economically by changing to fast-working, free-rinsing Oakite materials for . . .

1. Safely cleaning aluminum, tinned, galvanized and glass-lined food mixing, processing and handling equipment.
2. Cleaning sanitary fittings, pumps and piping.
3. Steam cleaning blanchers, scalders, exhaust boxes, cookers, tanks, vats, fillers, labeling machines, conveyors, carts, etc.
4. Cleaning canning sinks, packing tables, floors, walls, etc.
5. Washing metal and glass containers by tank or machine method before filling and labeling.
6. Quickly finding the right answer to other cleaning problems.

Of the 60 different Oakite materials available, there is one or more specially designed to meet your specific cleaning requirements of speed, thoroughness, safety and economy. All are backed by a binding guarantee!

War-Time Oakite Service FREE!

Whether or not you are now using Oakite materials, ALL our facilities . the competent, personal service of our Nation-Wide Field Staff, our Technical Research Laboratories, our 33 years' experience . are freely available to help you increase sanitation efficiency, improve plant maintenance, conserve equipment, save man-power! Your inquiry invited.

OAKITE PRODUCTS, INC.
26G THAMES ST., NEW YORK

Representatives in All Principal Cities of the United States and Canada

Nation-Wide Service In These Industries

CANNING & PRESERVING
BAKING
MEAT PACKING
GRAIN PRODUCTS
CONFECTIONERY
DAIRY PRODUCTS
SEA FOOD
FROZEN FOODS
MACARONI
SPICES & CONDIMENTS

OAKITE TESTED CLEANING

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Hackney
MILWAUKEE

BARRELS and DRUMS

HACKNEY CONSTRUCTION
Assures LONG LIFE

Hackney Seamless Barrel — with bolt closure

● A Hackney Container is built to last. That's why, year after year, Hackney Barrels and Drums afford important economies . . . provide easy and rapid handling . . . and assure the safe arrival of contents.

In Hackney Barrels and Drums, crevices have been eliminated. The interior is smooth, assuring easy and complete cleaning. The head is held air and liquid-tight by the Toggle-tite (or single bolt) closure. There is no chance of leakage or the entrance of foreign matter. The Hackney process of cold drawing makes them more resistant to hard knocks and transportation abuse.

For other than war products, metals must now be restricted, but there are no priorities on knowledge, skill, imagination and Hackney's interest in product improvement. In these intangible qualities, which have assured a long-time preference in the industry for Hackney Containers, is your promise of the continued superiority of Hackney cylinders.

Hackney Welded Type Drum —with Toggle-tite closure

Hackney
MILWAUKEE

PRESSED STEEL TANK COMPANY
General Offices and Plant:
1457 S. 66th St.,
Milwaukee, Wisconsin

Containers for Gases, Liquids and Solids

CAPITAL VIEWS

MANPOWER WORRIES—The food industries have two kinds of worries over the manpower question. Altogether too obvious for some time past has been the one of getting competent help to run plants at full capacity, or above. Another one is now developing which is going to pinch most as the 1943 crops are ready for harvest. It is the problem of manpower on the farms. Actually, the food industries may suffer more from the shortage of farm labor which impends than from shortage of help at their own works. It is quite evident that America cannot be at the same time the arsenal for democracy and the source of all food for the United Nations and also the source of 10 million or more fighting men in uniform. The American high command after consultation with the United Nations leaders will have to decide where we draw the line on putting men into uniform. Otherwise, there will be shortages of factory workers for materiel, agricultural workers for growing food materials, and other shortages, which is as serious as too few men at certain battle fronts. Unfortunately, there is not much that the food industries can do about these twin worries.

TINNED FISH—Experiments in the laboratories of Fish and Wildlife Service of the Department of Interior are planned to determine whether it will be practical to reduce tin consumption by the fish canning industry through use of thinner tin coatings, or alternate can materials. The tests will run for some months because they include tests of experimental packs by storage in various climates and durability tests, that is, close examination of packages after the normal methods of packaging and shipment for considerable distances. Regardless of the outcome of these tests, the fish canning industry is going to have to get along with less tin, and the cut in tin consumption will have to come even before these government experiments are done.

QUALITY STANDARDS—The executives of OPA think that cuts in the quality of many consumer goods amount to "hidden price increases." There has, therefore, been established a standards division of OPA which is to formulate quality specifications to make sure that corner cutting is not indulged in to the detriment of the consumer. The advisory committee to work with this new agency includes a considerable number of government and scientific folks who are experts on food. It appears, therefore, that food specifications are going to be among the most important first formulated. It is hoped that the leaders of each important division of the food industries will actively cooperate so that shyster competition will be most promptly identified and eliminated.

FOOD SUBSIDIES – Generally speaking, the food industries have sought to avoid government subsidies as a part of their enterprise. They have recognized the danger of such artificial distortion of price and trade relations. But such subsidies have come in at several points. Freight subsidies on coal to New England, absorption of some transport costs on petroleum products, and a number of other things like that have enabled retail prices to be maintained below ceiling levels despite greatly increased costs. Now comparable problems are confronting certain divisions of the food business, notably in the field of fats and oils. Actually, a hidden subsidy already has been arranged for certain seed crushers through a special half-cent per pound bonus from the Treasury, via Commodity Credit Corp. trading. There will probably be more cases of this sort because they are regarded as politically good in Washington. They make ceiling prices seem more stable. Indirectly they are a bit hard on the taxpayer. But Washington doesn't have to worry about a few millions in the present billion era.

BOTTLE STANDARDS—Smart food executives are discovering that a prompt change from their customary containers to standard forms may be tactically quite important. The government is very fond of its new program of standard shapes and sizes of glass containers. It is much more likely to grant promptly closure priorities to folks who are cooperating by climbing on the standards band wagon early and without pressure from Washington. Obviously, there will be no official admission of this kind of preference. But those who think they know the psychology around the containers offices of WPB are fairly certain of this trend of thought.

SCARCE MACHINERY—Any food executive that has been trying to get new equipment, or even equipment for maintenance and repair, knows the machinery shortage difficulties. But few have probably yet caught up with the fact that farm machinery shortage, which certainly threatens, may become one of the bottlenecks in raw material supply next year for some food industries. Those food plants that are dependent on highly mechanized farm production of their raw material will do well to look into this phase of the problem as they plan their 1943 production schedules.

HOME PROCESSING—Canners, preservers and others who find themselves with surpluses of fruits, vegetables, and other perishable raw materials must make a sincere effort to have prompt home usage or home preserving undertaken. Washington has not made adequate preparation for processing facilities in factories or packaging materials for processed goods. Some of the neglect was avoidable, but it is too late now to do anything about that this year. This places on the industry the unusual responsibility of seeing to it that raw materials producers in agriculture are not left without any market, even when the lack of market is not the fault of the industry. Where forced home preserving or unusual retail distribution plans can be developed, it is up to the industry to encourage these, even though it is encouraging what is normally a competitive activity. The overall benefit to the public which results will be the reward.

WPB Sets Up Food Distribution Section

WPB has formed a Transportation and Distribution Section of its Food Branch, with Ross E. Jones, Jr., as chief. Mr. Jones will work out details for conservation and concentration of transportation and distribution facilities within the food industry. He is on leave from the H. J. Heinz Co., Pittsburgh, where he is traffic manager.

Canned Foods Will Be Scarce

In spite of Government goals set last winter, weather, the labor shortage and lack of facilities combined to give an output of canned foods that will be short of full requirements. Among the quantities asked for last January were 44,000,000 cases of tomatoes, 42,000,000 cases of peas, 25,000,000 cases of corn and 14,000,000 cases of snap beans.

Figures already available indicate that output will fall short of these quantities by, perhaps, 10,000,000 cases of tomatoes and 8,000,000 cases of peas. Even should the other vegetables reach present expectations, there is definite evidence that the supply of canned vegetables for civilian consumption, after military and export needs are subtracted, will be below normal.

More or less the same situation holds true for the canned fruits, although yellow cling peaches will be available in more than normal supply and present outlook is for ample supplies of canned citrus products.

When it comes to canned fish, the supply situation is even worse than with fruits and vegetables. At this time, it appears doubtful if much over 2,000,000 cases of salmon and 1,000,000 cases of sardines will be released to civilians. Tuna is also scarce, primarily because of restricted fishing operations. And even canned shrimp supplies are way below normal.

As to canned meat, most of the sup-

CONSTRUCTION NEWS

	Pending (thousands)	Awarded October (thousands)	Total Awarded 1942 (thousands)
Bakery	.....	.....	$50
Beverages	.....	.....	1,227
Canning and Preserving	.....	.....	465
Cold Storage Plants	$100	$40	625
Confectionery	.....	.....	.....
Grain Mill Products	120	.....	635
Ice Manufactured	.....	.....	180
Meats and Meat-Products	.....	40	223
Milk Products	154	.....	1,467
Miscellaneous	165	40	4,154
	$539	$120	$9,026

SHORTCOMINGS OF STEAM AS A DISINFECTANT FOR FOOD PROCESSING EQUIPMENT REVEALED IN SIMPLE TEST

Steam may roar like a lion . . . but it's gentle as a lamb when it comes to killing food spoiling bacteria. Authorities on sanitation agree that a temperature of 170°-180°F. maintained for two to five minutes is required to kill food spoiling bacteria. Actual tests reveal, however, that only 12 inches from the nozzle, steam drops more than 30° *below* the minimum required for sterilizing.

Why be misled by appearances? With stocks of many raw materials limited, the problem of avoiding spoilage becomes increasingly urgent. Maximum output must be obtained from supplies available. Disinfecting contaminated containers and processing equipment or even the raw food product itself with steam is at best an uncertain gamble.

How hot is steam? Just place a thermometer at varying distances from the nozzle of a steam hose and see for yourself.

Live steam has other disadvantages. The constant throbbing of a steam hose in a vat of water soon opens up seams, loosens fittings, brings on costly repairs. Wide fluctuations in temperature impose a similar penalty when coolers, freezers and other equipment are treated with steam. Painted walls blister and peel through constant exposure to steam.

WIN THE WAR WITH FOOD

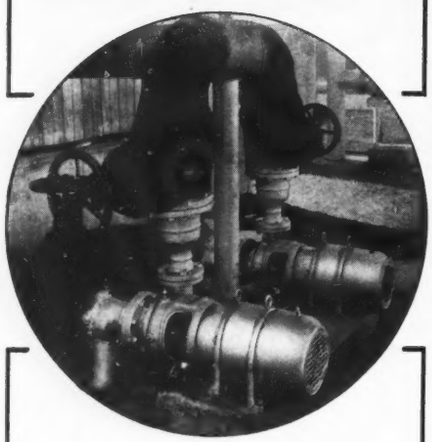
All these handicaps can be avoided . . . and food spoiling bacteria, mold and yeast be brought under effective control . . . with DIVERSOL. Although powerful and quick-acting, DIVERSOL will not corrode or damage equipment thus avoiding undesirable metallic off-tastes and flavors. Comes in pure white, readily soluble crystals of uniform fixed strength. Simply add to water and this streamlined bactericide is ready for action . . . just rinse or spray the previously cleaned equipment. There is no sludge, no muss, no film, no scale. DIVERSOL is non-poisonous and leaves no after-taste or disinfectant odor. It is the ideal bactericide for the food plant.

Diversey D-Men At Your Service

Today, more than ever before, problems in sanitation require the individual attention of trained experts working under the direct supervision of research chemists and bacteriologists. Such are the Diversey D-Men . . . at your service . . . able and anxious to help you solve your cleaning and sterilizing problems. Write to The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.

NEED HELP WITH A SANITATION PROBLEM? Just call a DIVERSEY D-MAN

THE MOTORPUMP SERVES ALL INDUSTRIES



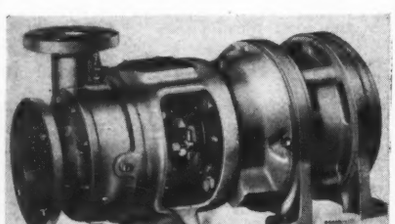
Cameron Motorpumps fit the liquid handling needs of so many industries that you find them everywhere.

They are furnished in a wide variety of materials for handling not only water but many corrosive and erosive liquids as well.

Outstanding features of the Motorpump are: built-in electric motor, extra large shaft and bearings, packed shaft sleeves and renewable wearing rings.

Capacities range from 5 to 1500 gals. per min.; heads from 10 to 500 ft.

Ask for bulletin 7764 or let an I-R engineer discuss Motorpumps with you.



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Ingersoll-Rand

Cameron Pump Division

11 BROADWAY, NEW YORK, N.Y.

ply is already under contract to the government or held in reserve.

Apparently, those canners able to undertake dehydration of foods stand to gain a good share of the civilian market in 1943.

October Report Shows More Crop Increases

In spite of unfavorable weather conditions in various localities, the October report of the Crop Reporting Board of the Department of Agriculture showed further increases in crops over the September estimates.

The corn crop is now expected to total 3,132,002,000 bu., compared to a September forecast of 3,015,915,000 bu., a 1941 crop of 2,672,541,000 bu. and to a 1930–1939 average of 2,307,452,000 bu. Wheat output figures were raised again, this time to 984,046,000 bu., compared to 981,793,000 bu. estimated on September 1, a 1941 crop of 945,937,000 bu., and an average crop in 1930–1939 of 747,507,000 bushels.

Among the other grains, the October estimates were: Oats, 1,369,540,000 bu.; barley, 426,188,000 bu.; rye, 59,665,000 bu.; and rice, 71,598,000 bushels.

Other October estimates included: Sugar beets, 12,969,000 tons; sugar cane, 7,369,000 tons; sweet potatoes, 70,544,000 bu.; potatoes, 376,309,000 bu.; peanuts, 2,921,950,000 lb.; soybeans for beans, 200,701,000 bu.; dry peas, 7,255,000 bags; dry beans, 21,269,000 bags.

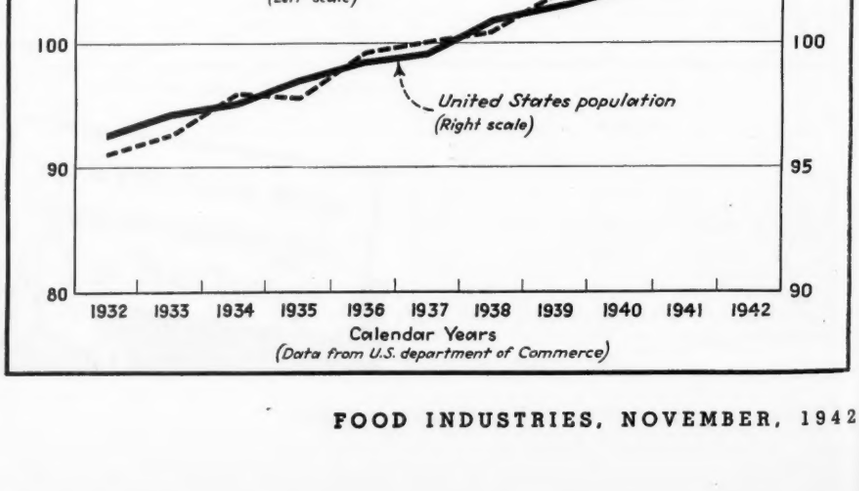
Fruit crop estimates also showed changes, with commercial crop apples going to 128,386,000 bu. compared to 122,059,000 bu. in 1941 and to a 1930–1939 average of 123,798,000 bu. The total peach crop is now reported at 65,498,000 bu., compared to 74,451,000 bu. in 1941 and to a 1930–1939 average of 54,706,000 bu. The pear crop was 30,472,000 bu., compared to 29,533,000 bu. in 1941, and the grape yield is estimated at 2,535,000 tons compared to 2,729,000 tons last year. Prune production is expected to exceed last year's by 10 percent, apricot production is up 9 percent over 1941, and the 1942 cherry crop showed an increase of 23 percent over last year. Present indications for citrus fruit production in the 1942–43 crop year indicate a new record output of around 135,000,000 boxes, all kinds.

Commodity Prices Start To Decline

Promptly after the imposition of ceilings on the prices of all commodities, declines were noted in various commodity price indexes. The general commodity price index of *The New York Journal of Commerce* stood at 104.3 on October 10, 1942. A week before, this index registered 104.7 and the week before that it was 104.4, while its level on September 12th was 104.2. The figure for this same index on October 11, 1941, was 96.1.

The grain price index of *The New York Journal of Commerce* was 90.1 on October 10th, which compares to a figure of 92.7 on September 12th. The food price index of the same publication registered 107.3 on October 10th, compared to 106.6 on September 12, having risen to a high of 107.7 between these two dates.

Among the spot commodity prices, not many changes were noted, and most of those were decreases. These changes included: Corn, No. 3, yellow, Chicago,



at 84c. on September 12th, fell to 78¼c. by October 10th. Lamb decreased from 27c. to 24c. and pork loins fell from 29c. to 28c. in the same four weeks period. Flour also decreased, from $6.50 to $6.45 per bbl.

In contrast, eggs increased from 36½c. to 37¼c. between September 12th and October 10th, while butter also rose, from 43c. to 46½c.

All other spot commodity prices were reported unchanged for the period.

INDICATORS

Flour production in September, 1942, as reported by *The Northwestern Miller* for mills producing 65 percent of U.S. output, was 6,334,511 bbl., up from 6,009,926 bbl. the month before and comparing to 6,230,126 bbl. produced in September, 1941.

Confectionery and competitive chocolate products sales in August, 1942, totaled $26,720,000, as reported to the Department of Commerce by 217 manufacturers. This is an increase over sales in August, 1941, by the same firms, of 39 percent. Sales for the year to date, at $199,869,000 for these firms, were up 33 percent over sales during the corresponding eight months of last year.

Sweet corn production in 1942 for processing, according to revised figures released by the Department of Agriculture late in September, is expected to total 1,332,000 tons, compared to 1,329,000 tons reported a month earlier.

Tomato production in 1942 for processing, as reported by the Department of Agriculture late in September, will be around 3,194,000 tons, compared to a forecast one month earlier of 3,163,000 tons. This increase is forecast in spite of unfavorable weather conditions existing in August and September.

Green lima bean production for processing this year was reported by the Department of Agriculture late in September at 45,720 tons, compared to a report of 46,820 tons a month before.

Beet production for canning this year was reported by the Department of Agriculture late in September at 104,790 tons, compared to a production of 133,030 tons in 1941.

Pimiento production for processing in 1942, reported at 19,770 tons in September, is now forecast by the Department of Agriculture at 24,270 tons.

Cherries, red sour pitted, canned in 1942 totaled 3,061,809 actual cases, according to the National Canners Association. This compared to production in 1941 of 2,064,475 cases.

Cling peach pack in California this year totaled 14,227,084 actual cases, compared to 11,037,581 cases last year, and second only to the 1928 pack of 14,596,000 cases.

Salmon pack this year, according to latest estimates of WPB, totaled 5,780,000 cases, of which 3,468,000 cases are held for the Government, 1,156,000 cases are released for civilians' present use, and 1,156,000 cases are being held until further notice.

Fruit cocktail pack this year is now estimated at 5,530,754 cases, compared to 4,915,720 cases last year.

Peas, green, canned in 1942 are now estimated by the National Canners Association to total 34,852,651 actual cases, a new record, compared to 29,017,539 cases in 1941, which was the previous record.

Oleomargarine sales in August, 1942, as indicated by sales of internal revenue stamps, were 20,978,564 lb., compared to 23,254,084 lb. a year previous.

Chick output, as reported by commercial hatcheries for August, 1942, totaled 22,392,000, up 17 percent over August, 1941, which was the previous August record.

Eggs, frozen, produced in August, 1942, totaled 5,636,000 lb., compared to 9,848,000 lb. in August, 1941, and to 5,115,000 lb. in August, 1940.

Eggs, dried, whole, produced in August, 1942, totaled 20,645,417 lb., an increase of 771 percent over the 2,370,406 lb. produced in August of last year.

Milk, fluid, sold in August, 1942, was 17.16 percent greater than in August, 1941, according to Milk Industry Foundation.

Butter, creamery, produced in August, 1942, totaled 169,620,000 lb., the highest August output on record and 0.8 percent over August, 1941, production.

Butter, creamery, produced during the first eight months of 1942 was 1,228,855,000 lb., a decrease of 5.3 percent below the same period of 1941, but 5.7 percent over the 1931-1940 average for the period.

Cheese, American, produced in August, 1942, amounted to 87,225,000 lb., 15.3 percent over August, 1941, production, and 84.3 percent over the 1931-1940 August average.

Cheese, American, produced during the first eight months of 1942 totaled 702,625,000 lb., an increase of 40.6 percent over the output of the same period of 1941, and 107 percent over the 1931-1940 average for the period.

Milk, evaporated, produced in August, 1942, totaled 277,969,000 lb., compared to 308,855,000 lb. in August, 1941, and an increase of 46 percent over the 1936–1940 August average.

Milk, dried skim, produced in August, 1942, totaled 55,100,000 lb., up 49 percent from August, 1941, and 76 percent above the 1936–1940 August average.

Milk, dried whole, produced in August, 1942, totaled 5,790,000 lb., an increase of 31 percent over production in August, 1941, and 220 percent above the average August production in 1936–1940.

Fruits, frozen, in storage on October 1, 1942, totaled 222,338,000 lb., compared to 211,503,000 lb. on October 1, 1941, and to a 1937–1941 average of 159,629,000 lb. for the same date.

Vegetables, frozen, in storage on October 1, 1942, totaled 115,496,000 lb., compared to 99,238,000 lb. a year earlier.

Butter, creamery, in storage on October 1, 1942, amounted to 125,994,000 lb. The figure on October 1, 1941, was 202,957,000 lb., and the average for October 1 in 1937–1941 was 163,008,000 pounds.

Cheese, all kinds, in storage on October 1 of this year was 254,554,000 lb., compared to 188,337,000 lb. a year before and to a 142,872,000 lb. average for the same date in 1937–1941.

Eggs, case equivalent, in storage on October 1, 1942, totaled 11,640,000 cases. On October 1, 1941, the quantity was 10,199,000 cases, and the average October 1 figure in 1937–1941 was 9,422,000 cases.

Poultry, all kinds, in frozen storage on October 1, 1942, totaled 116,535,000 lb., compared to 96,701,000 lb. on October 1, 1941, and to an average in 1937–1941 of 74,475,000 lb. for the same date.

Meats, all kinds, in cure and frozen storage on October 1 of this year totaled 455,128,000 lb. A year earlier the figure was 512,402,000 lb. and the 1937–1941 average for October 1 was 414,936,000 pounds.

Lard in storage on October 1, 1942, totaled 54,547,000 lb. and rendered pork fat in storage on the same date amounted to 7,714,000 lb. The corresponding figures a year before were 214,299,000 lb. and 3,661,000 lb. The average total for the two products in 1937–1941 was 139,001,000 pounds.

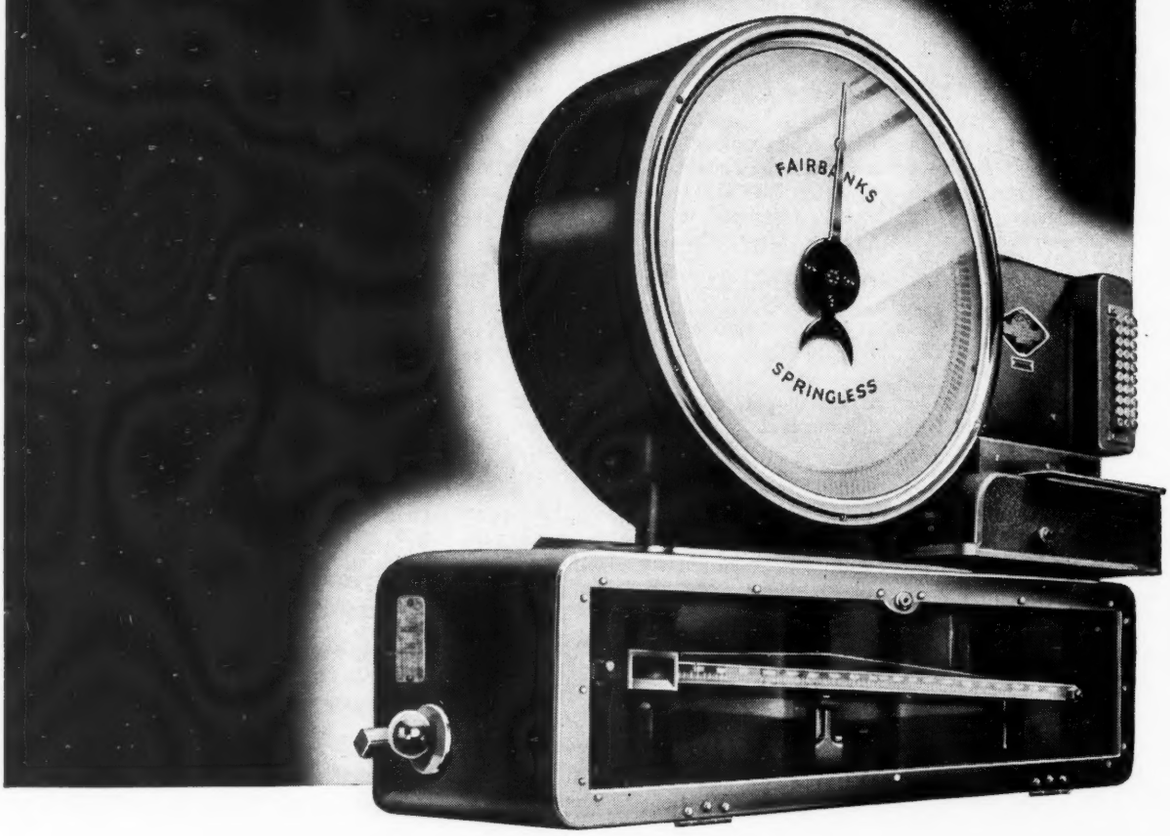
Business activity index of *Business Week* registered 186.7 on October 10, 1942, compared to 186.1 a month earlier and to 160.8 for the corresponding 1941 date.

Weekly wholesale food price index of Dun & Bradstreet stood at $3.98 on October 6, 1942, the highest figure in 22 years. This is an increase of 16.9 percent over the figure of $3.32 for the corresponding 1941 date.

Cost of living index of National Industrial Conference Board for September, 1942, was 98.6, up from 98.1 a month before and 8.6 percent above September, 1941.

Blocking

THE INVISIBLE SABOTEUR!



ERRORS that could be prevented . . . operations that could be speeded up . . . methods that could be improved . . . all of these and others accomplish the ends of the saboteur even if they are unintentional.

Frequently engineers and executives are amazed by the timesaving applications that can be made with modern scales. For modern scales are *much more* than better weighing instruments. They count small parts. They weigh materials and commodities in motion. They read and keep books, making PRINTED RECORDS, much faster and with *unfailing accuracy* impossible for human eyes and hands.

Use your priority to get Fairbanks weighing equipment that will block the invisible saboteur in your plant, *now* — and make money for you in years to come. Fairbanks scale engineers are ready to help you. Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago, Illinois.

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INDUSTRY

American Bakeries Co., operating 19 plants in the Southeast, has purchased $50,000,000 in war bonds for employees, and has reduced mileage on its delivery trucks 18,000 miles per week, as contributions to the war effort.

Beatrice Creamery Co., Chicago, has acquired the business of Emmadine Farms Ice Cream Co., New York. The purchase was made by Meadow Gold Ice Cream Co., New York subsidiary of Beatrice.

Bozeman Canning Co., Portland, Ore., has opened a new plant in Waitsburg, Wash., bringing the total of company plants in that area to five.

Bulman's Ltd., Vancouver, B. C., is establishing a new research and control laboratory and processing library at Vernon, B. C., headed by Alice Stevens.

Canadian Canners Western, Ltd., has erected a large new warehouse at South Penticton, B. C., following completion of railway terminal facilities in that city.

Chase Candy Co., St. Joseph, Mo., has been awarded a Minute Man flag by the Treasury Department, indicating that over 90 percent of employees are purchasing war bonds.

Cherry Growers, Inc., Traverse City, Mich., is erecting a new factory to process dehydrated foods for the Army and Lease-Lend.

Florida Citrus Canners Cooperative has received WPB priorities for equipment to enlarge its plant for citrus concentrates at Lake Wales, Fla.

General Foods Corp. has put into national distribution its Birds Eye quick-frozen mixed vegetables, recently marketed in test areas.

General Mills, Inc., has purchased the production facilities of Purity Oats Co. at Keokuk, Ia.

Huter-Quest Co. Inc., Louisville, Ky., has been organized with capital of $200,000 to manufacture food products and deal in bakery, confectionery and dairy supplies.

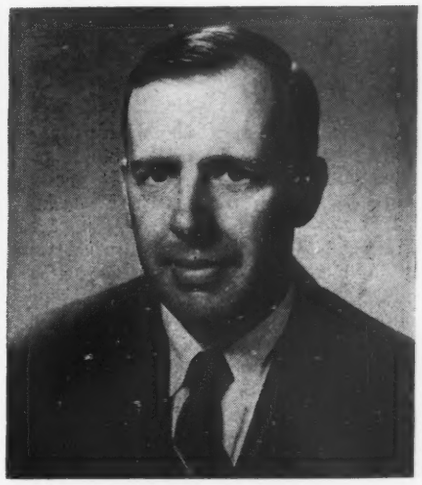
Interstate Creamery Co., Inc. has purchased Cedar Springs (Mich.) Milk Co. The plant will be expanded and spray equipment will be installed for processing spray powder milk.

Miller Bros. Food Co., Edinburg, Tex., will operate the first dehydration plant in south Texas, at San Carlos, where vegetables and citrus fruits will be dehydrated for government use.

Sprague-Warner & Co., Chicago, is moving to the Heywood-Wakefield Building in that city. The present Sprague-Warner property with its outstanding cold storage plant, has been taken over by Defense Plant Corp.

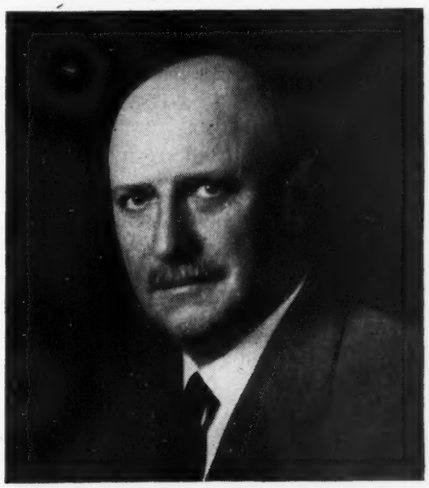
REED HARTEL

National Dairy Products Corp. has elected Reed Hartel secretary of the corporation. Mr. Hartel joined the organization last March and was named assistant secretary a month later. He was formerly secretary of the North American Co.



DR. CHARLES K. TUCKER

Dr. Charles K. Tucker has been named head of the bureau of economics of the Borden Co. He has been acting in that position for some time. Prior to joining the Borden Co. in 1929, he was with Dairymen's League Cooperative Association.



CHARLES M. ROBERTSON

Kroger Grocery and Baking Co., Cincinnati, Ohio, has elected Charles M. Robertson president to fill the vacancy created by the death of Albert H. Morrill. Mr. Robertson has been prominent in business circles in Cincinnati for 30 years, as treasurer of Baldwin Piano Co. and president of Proctor & Collier Co., advertising and merchandising firm.

Worcester Salt Co., New York, has published a booklet, "Vitamins and You," which includes a short history of vitamins, a table of vitamins and their beneficial effects, and a high-vitamin-food chart.

PERSONNEL

V. S. Amundson, associate professor of poultry husbandry, University of California College of Agriculture, has been presented with the Borden Award for 1942 in poultry science.

G. S. Bohart, formerly of the research laboratories, National Canners Association, is now with the Western Regional Research Laboratory, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, Albany, Calif. He is doing research on the preservation of vegetables by freezing.

Marvin Brown, assistant to Guy M. LaPierre, vice-president in charge of export of General Foods Sales Corp., has been appointed manager of the company's export department. Mr. LaPierre, who organized the department, has retired.

Hamilton Browne, Grand Rapids, Mich., has become Chicago branch manager of Quaker Oats Co. succeeding C. W. Thomas, retired.

Donald K. Davis, president of General Mills, Inc., Minneapolis, Minn., has been

appointed director of the Program Coordination Division, WPB, which will integrate national resources for their effective use in the war program.

H. P. Davis, University of Nebraska, Lincoln, Neb., has been elected president of American Dairy Science Association for 1943. Vice-president is A. C. Dahlberg, New York Agricultural Experiment Station, Geneva, N. Y.

Carl J. DeBoer of the University of Illinois has been elected assistant professor of dairy industry to fill the vacancy caused by the death of Merrill J. Mack.

Daniel F. Gerber, vice-president of Gerber Products Co., Fremont, Mich., has accepted appointment as principal business consultant on fruits and vegetables in the Grocery Products Branch, Food Price Division, OPA.

BURTON F. BOWMAN

Burton F. Bowman has been appointed director of the new War Supply Department of Pillsbury Flour Mills Co. A member of Pillsbury's Post War Planning Committee, Mr. Bowman has been devoting his energies to army contract supply work. He has been in the specialty department and grocery products sales division of Pillsbury.

William F. Goodale, Jr., vice-president of Berwick Cake Co., Boston, Mass., and a specialist in cakes, cookies and pies, has been named assistant to R. J. Conly, head of the bakery unit of OPA.

Paul F. Sharp is now director of research, Golden State Co., San Francisco, filling the place vacated some time ago by Dr. Paul D. V. Manning, who is now head of the research and development department, International Minerals and Chemical Co. Dr. Sharp has taken a leave of absence from Cornell University.

George C. Spitzmiller, former vice-president and general manager of the western division, has been appointed executive vice-president of Best Foods, Inc., New York.

W. E. Stringer has succeeded F. L. Chappell as production manager of the byproducts division of Sheffield Farms Co., Inc.

NEW NABISCO BAKERY IN ATLANTA

National Biscuit Co. has begun operation of its new cracker bakery in Atlanta, Ga., a unit 1,200 x 315 ft., providing 425,000 sq. ft. of floor space. The new plant is a daylight bakery consisting of one high story with a mezzanine balcony. Straight line production is the outstanding feature. Traveling band ovens equipped with the latest safety appliances are a part of the new equipment. The bakery is of modern uniform construction providing a maximum of flexibility for future expansion.

DEATHS

John A. Booker, 75, for many years president of Booker, Scott & Moore Candy Co., Oct. 11, in Wilmington, Del.

C. Fred Crow, 53, president and manager of Chicago Milk Products Co., Elgin, Ill., recently, in Elgin.

James F. Dougher, traffic manager of Burnham & Morrill Co., Portland, Me., Oct. 5, in Portland. He was a member of New England Shippers Association.

Ross Aiken Gortner, 57, chief of the agricultural chemistry division of the University of Minnesota and 1942 recipient of American Association of Cereal Chemists' Osborne Medal, Sept. 30, in Minneapolis.

Edwin P. Gray, 57, president of Gray & White Co., poultry and egg distributors, recently, in Ann Arbor, Mich.

Henry R. Kingsley, 76, former vice-president and secretary of Peter Ballantine & Sons Brewing Co., Sept. 27, in Little Silver, N. J.

August Luer, 86, head of the Luer Packing Co., Alton, Ill., and president of the Alton Banking and Trust Co., Sept. 22, in Alton.

William Maybaum, 71, president of Maybaum Packing Co., Newark, N. J., Sept. 30, in Newark.

Morris A. Pozen, 55, consulting chemist specializing in brewing and food chemistry, Sept. 29, in Brooklyn, N. Y. He was formerly with the Federal agricultural and health departments and and had been technical editor of *Modern Brewery Age.*

William Ridgway, 84, founder of Northwestern Yeast Co., Chicago, Ill. Oct. 6, in Pasadena, Calif.

George Powell Williams, 71, one-time president of the National Sirup and Molasses Association and former president of Bliss Sirup Refining Co., October 4, in Kansas City.

ASSOCIATED INDUSTRIES

American Society of Mechanical Engineers has elected as 1943 president Harold V. Coes, vice-president of Ford, Bacon & Davis, Inc., New York.

Dewey and Almy Chemical Co.'s president, Col. Bradley Dewey, has been appointed Deputy Rubber Director under William Jeffers.

Foote Bros. Gear and Machine Corp., Chicago, has appointed Russell Davis vice-president. He will continue as general manager of the industrial gear division.

Leads and Northrup Co., Philadelphia, has been awarded the Army-Navy "E" for excellence in production.

Merck & Co., Rahway, N. J., has appointed Carl M. Anderson executive assistant to the president, a new office established because of war activities and expanded business of the company.

Monsanto Chemical Co. has collected and sold for use in war production more than 3,700,000 lb. of scrap materials. The scrap drive is part of a company effort to either redeem or junk all obsolete equipment.

Westinghouse Electric and Manufacturing Co.'s home economics institute has prepared a simplified guide to meal planning, "The ABC's of Eating for Health," as an aid to the national nutrition program.

FOOD EQUIPMENT NEWS

Protective Laboratory Glassware

CORNING GLASS WORKS, Corning, N. Y., has developed a line of colored laboratory glassware for use in protecting certain light-sensitive materials. This new line consists of 43 items fabricated from "Pyrex" brand chemical glass No. 774. Its protective "Lifetime Red" color is an integral part of the glass and as permanent as the glass itself. The maker claims that ability to retard deterioration from light influence in this glassware is combined with mechanical strength, chemical stability and thermal resistance. Applications in materials containing light-sensitive vitamins, as well as use in other fields, are indicated for this new product.

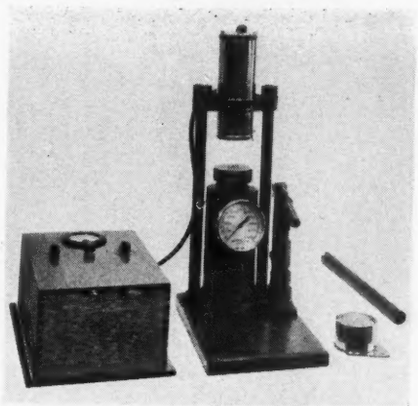
Electric Industrial Truck

CLARK TRUCTRACTOR DIVISION, Clark Equipment Co., Battle Creek, Mich., which for many years has built gas-powered vehicles for factory handling purposes, is now providing its trucks with full electric equipment, using storage battery power, for installations where electric operation is best suited to the job. The series of machines so equipped are of 2,000 to 7,000 lb. capacity and lift their load by means of a hydraulic pump driven by a series-wound motor. This same pump operates the tilting unit, enabling the operator to tilt the load back 10 degrees in 5 seconds, in order to provide safety in movement. For tiering operations, the unit can be tilted forward 3 degrees in one second.

These machines have four speeds forward and four speeds in reverse, with speeds up to 6 miles per hour under full load. Drive is on the front wheels with rear wheel steer. Electric equipment and motors are supplied by General Electric Co. and the customer has the choice of battery make.

Moisture Measuring Instrument

MOISTURE REGISTER CO., 5117 Kinsie St., Los Angeles, Calif., has developed an electrical unit for testing the moisture content of dehydrated vegetables. Known as the Granular Moisture Register, it operates on a small quantity of the material to be tested, usually from 100 to 200 grams, which is placed in the material cup, which is then placed in position in the instrument. By means of a lever, the material is then



Instrument for measuring the moisture content of dehydrated foods.

subjected to a pressure of a certain specified amount, for the purpose of eliminating entrained air from the sample. When the predetermined pressure is reached, as indicated on the pressure gage of the instrument, the reading on the meter dial is recorded.

The principle of measurement employed in this instrument is that of a high frequency electrical field set up in front of the electrode, which field penetrates the material and becomes a function of the moisture content. The result is indicated on the meter dial and translated into percentage of moisture content by reference to calibration graphs or tables.

The manufacturers state that moisture content tests made with this instrument do not exceed 2 to 3 minutes per sample in required time, thus facilitating accurate control of the dehydration process, and adherence to specifications. The instrument complete weighs 55 lb. and occupies a space approximately 15x20x17 in. It is operated by batteries and consequently can be used in places where electric current is not readily available.

Intrusion Protection System

PHOTOSWITCH, INC., 21 Chestnut St., Cambridge, Mass., has brought out the Type A28L control for use in protection against intruders and saboteurs in industrial plants. This device consists of a light source which projects a practically invisible light beam for distances up to 700 ft. and illuminates a light sensitive cell. If the light beam is broken by an intruder, the photoelectric control contacts are closed and can be caused to operate an alarm, to turn on lights, to

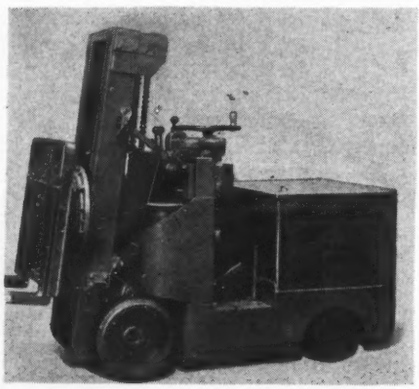
Photoelectric intrusion protection equipment.

Well known manufacturer of gas powered trucks now produces a line of storage battery electric industrial trucks.

close gates or to perform other necessary protective operations. The control is provided with a latching unit including a push button station which may be located at any convenient point. This serves to latch the alarm in operation once the light beam has been momentarily broken until the reset button is operated. The device is designed to be unaffected by changes in local lighting conditions and is designed to operate in daylight or night conditions for periods of 24 hours a day.

Rotating Fork Truck

ELWELL-PARKER ELECTRIC Co., Cleveland, Ohio, has brought out the Model F-23T center control truck, in which the lifting forks are mounted on a rotating base capable of making a complete revolution.



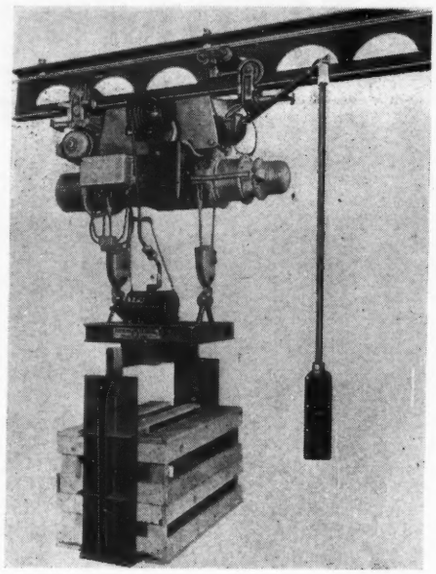
Electric industrial truck of fork type with rotating forks.

The purpose of the rotating forks is to make the truck adaptable to a wider variety of jobs. At top position, the forks can carry either suspended or supported loads while when locked into place at bottom position they can handle pallets or low skid platforms with no adjustment. This truck is electric storage battery operated and will handle up to 4,000 lb. of load.

Box Carrier

CLEVELAND TRAMRAIL DIVISION, Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a motor-driven grab and carrier for crates and boxes. The purpose of this device is to handle in and out of storage or from one elevation to another. The unit is designed to enable quick stacking or removal of boxes to a great height with safety, thus increasing the storage capacity of a given area.

The grab and carrier are completely motorized, with all operations controlled by six buttons of a pushbutton station. When desired, this unit can be supplied with an operator's cab in which the controls are located. The arms of the grab are extended and retracted



Carrier for handling boxes in and out of storage.

by means of geared slide bars that are driven by the motor mounted on top. Power is supplied to this motor through a flexible cable which winds on a spring-type reel. Hoisting is accomplished by means of a double hook cable type electric hoist. The unit shown in the accompanying illustration will handle one or more boxes at a time and will lift loads up to 1,500 lb. to a distance of 20 ft. The arms of the grab may be spread to a maximum of 36 in. or retracted to a minimum of 18 in. Units can be provided for heavier loads and for other dimensions.

pH Testing Set

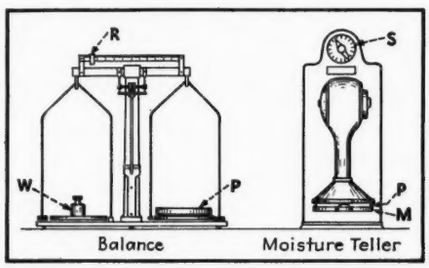
LAMOTTE CHEMICAL PRODUCTS Co., Towson, Baltimore, Md., is making a new "Micro" pH testing set for which are claimed facilities never before offered in the colorimetric system of pH determination. With this set, it requires less than 0.5 ml. of the sample to make the determination and the accuracy is stated to be plus or minus 0.1 of a pH unit. Another feature is that turbidity and color in a sample do not interfere with the pH determination. Time of making a determination is stated to be one minute or less. The standard set covers the range of pH 5.2 to 8.6 and is available in a compact case including all the necessary glassware, indicators and full instructions for use.

Moisture Tester for Dehydrated Foods

COLLOID EQUIPMENT Co., INC., 50 Church St., New York, has developed two models of its instrument, the "Moisture Teller," for use in the food industries, particularly in determining the moisture in such products as dehydrated fruits, vegetables, milk and eggs. These are Models 271-T and 272-T. The first of these models is used in connection with a special "Pulp Balance", while the second model is used in connection with a standard analytical balance. The makers consider the Model 271-T—Pulp Balance combination the best for practical plant use, as they state that any unskilled operator can use it with a minimum of instruction.

In determining moisture with this equipment, two spoonfuls of the material to be tested are placed in the pan marked *P* in the accompanying drawing. Then sufficient material is removed with the spoon to balance the counterweight *W* furnished with the balance. In this weighing operation the pan *P* is placed on the right-hand pan of the balance and the rider of the scale should be placed at zero.

Next the material is spread evenly in the pan and the pan is then placed under the "Moisture Teller" shown at the right. This is done by depressing the pan holder *M* and placing the pan in it. The switch *S* is then turned to pass 3 as shown in the drawing and then the switch is turned to the time required to dry the sample to be tested to constant weight.



Balance and Moisture Teller used for determining moisture in dehydrated foods.

After drying, the pan is put back on the balance and weighed by means of moving the rider *R* until a balance is secured. The reading of the rider scale is then multiplied by two to obtain the percentage of moisture (when a 50 gram sample is used). If desired, the balance may be equipped with a rider scale reading direct in percentage of moisture for 50 gram samples.

Diaphragm Pump

T. SHRIVER & Co., Harrison, N. J., has added a newly designed unit to its line of diaphragm pumps. This is a top-feed, bottom-discharge unit particularly adapted for the handling of slurries or suspensions which contain a high percentage of crystalline or quick-settling solids and which may be corrosive, abrasive, heavy, valuable, delicate or hazardous.

In operation, the material is fed into the upper manifold through the ball

A message

TO ALL WHO SELL AND USE "FREON-12"

A CYLINDER SHORTAGE IS AVOIDABLE

With your immediate help we will be able to meet your orders for civilian needs

YOUR COOPERATION IN THIS PROGRAM IS NEEDED NOW—

There is no shortage of "Freon-12" but *an acute shortage of "Freon" cylinders is imminent.* In this statement we explain why this shortage threatens and how you can prevent it.

No steel for new cylinders—The steel shortage is acute as evidenced by numerous limitation orders of the War Production Board. As a result, manufacturers of the type of steel cylinders used for refrigerants are only able to make deliveries on orders rated AA-1 and AA-2. If you have followed the priority situation, you know that it is practically impossible to obtain these high ratings for any materials for civilian needs. Thus, new cylinders for refrigerants are out of the picture.

Cylinders adequate, if returned—The bright side of the picture is the fact that there are enough "Freon" cylinders in *existence* to meet civilian needs *if you see that empty cylinders are returned promptly.*

Unfortunately many sellers and users of "Freon-12" have not returned cylinders as promptly as they should. To forestall the threatened shortage we appeal to you to assist in carrying out the program outlined in the box at the right.

What This Means to You

It's a patriotic duty of every reseller and user of "Freon-12" to get these empty cylinders back. By making one cylinder do the work of two you release steel for bombs, tanks and other armament needed to fight the Axis. Furthermore, cylinders help maintain this nation's health with refrigeration they make possible.

Avoids stricter regulation—There have been rumors that WPB would have to resort to unusual methods of allocation. This need not be necessary if each reseller and user makes a drive now to return empties.

Helps assure your supply—There is no lack of plant capacity or of raw materials for making "Freon-12." You and we, by working together, can lick this situation. Your efforts will be appreciated and reflected by prompt deliveries of "Freon-12" to you and your customers.

A 4-POINT PROGRAM

To Prevent a Cylinder Shortage and Insure Adequate Deliveries

1. **CHECK RECORDS NOW** *and find out who has cylinders in which you sold "Freon" this year.*
2. **TELEPHONE** *every customer who has "Freon" cylinders and urge him to return his empties at once.*
3. **SEND TRUCKS** *to bring in cylinders not otherwise obtainable.*
4. **SHIP EMPTIES** *to Kinetic Chemicals, Inc., Carneys Point, N. J.*

KINETIC

FREON

REG. U. S. PAT. OFF.

safe refrigerants

"Freon" is Kinetic's registered trademark for its fluorine refrigerants.

The PROBLEM
-by Uncle Sam

Cold Storage Space Becoming Scarce

WASHINGTON, Sept. 19 (U. P.). —The Office of Defense Transportation, warning that a "pinch" impends in refrigerated storage space required to preserve stocks of perishable foods, appealed tonight to operators and users of refrigerated warehouses to utilize cold storage facilities as efficiently as possible. To combat the threatened short-

The SOLUTION
-by Jamison

THE PROBLEM—"Food may win the war" * * * Perishable foods need refrigeration. * * * Scarcity of refrigerated space requires greater efficiency in every plant.

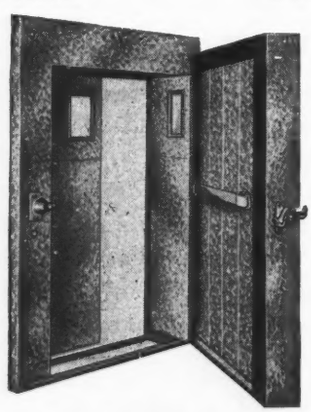
THE SOLUTION—Check your plant today—see that every cubic foot possible is available for storage. * * * Investigate the advantages of eliminating space-wasting vestibules by using JAMISON-BUILT VESTIBULE DOORS (as illustrated). * * * Guard every opening with an efficient JAMISON-BUILT DOOR—backed by 50 years specializing on doors.

Consult nearest branch, or address

JAMISON COLD STORAGE DOOR CO.

Jamison, Stevenson & Victor Doors

HAGERSTOWN, MARYLAND



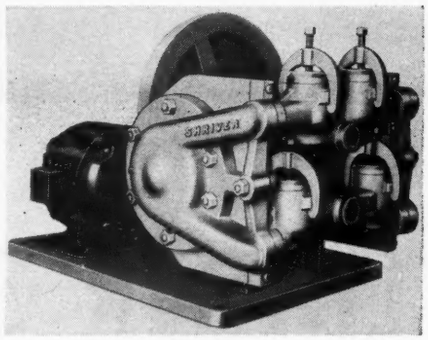
Fire-retarding metal-clad

Super Freezer Vestibule Door.

Send for Bulletin 126.

A typical example of how Jamison creates doors to meet all needs

JAMISON-BUILT COLD STORAGE DOORS



New design of diaphragm pump for handling fixed suspensions.

valves and into the heads at each end of the pump in a clean, sweeping motion, thereby assuring that at each forward motion of the diaphragm-covered piston, material is forced out through the lower pair of ball valves and out through the lower manifold. By this means any settling or accumulation of solids in the pump-heads is prevented.

Positive displacement of the material is effected by means of the double-acting pistons, which are always submerged in a bath of lubricating oil. Since the working mechanism is entirely separated from the liquid heads by rubber diaphragms, there can be no effect by the material on the mechanism. Consequently, the only parts of the pump which need be made of whatever metal or rubber-covered metal is best suited to the conditions, are the liquid heads, the ball valves and the manifold.

A feature of this pump is the interchangeability of the valve manifolds, so that the pump may be fed from the bottom and discharged at the top if desired.

This pump is made in a complete range of capacities from 1 to 100 gal. per minute, for delivery pressures up to 100 lb. per sq. in., and for suction lifts as high as 18 ft. Any type of motor may be applied for driving.

Air Circulator for Ultra-Violet Lamps

To INCREASE the effectiveness of ultra-violet lamps in destroying microorganisms, Reynolds Electric Co., 2650 W. Congress St., Chicago, developed the "Reco" Radi-Aire circulator. This gives a forced circulation of air throughout the room where ultra-violet lamps are being used, so that all the air is exposed to the radiation in a slow movement, giving time for the rays to be effective.

In operation, this circulator forces the air upwards, causing it to travel along the ceiling, down the walls and then up in the center of the room again. The circulator is made in 20- or 24-in. propeller size and in three models, one for ceiling mounting, one for mounting on a low stand, and one for mounting on a high stand. All three models operate on 110-volt, 60 cycle, alternating current.

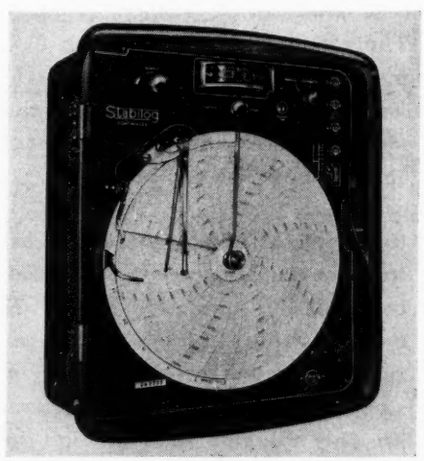
Scale Preventer

CALGON, INC., Hagan Building, Pittsburgh, Pa., has brought out "Micromet," a product designed to prevent scale formation in hot water heater coils and in mechanical bottle and can washing equipment. This is a glassy sodium phosphate product made of food-grade material and carefully crushed and sized. When placed in cold water it dissolves at the rate of 25 percent per month. The usual feed necessary to correct scale trouble is said to be only 5 parts per million, or one pound to each 24,000 gal of water.

In use, Micromet is fed into the feedwater line by means of a simple pot type feeder which can be made of standard galvanized or black iron pipe by the local plumber to conform to the requirements of the individual system. To prevent formation of lime scale in the rinse section only, the feeder may be placed in the rinse section feedwater line. Placing the feeder in the line ahead of the hot water heater will prevent scale formation in the heater coils as well as in the washing equipment.

Control Instruments

FOXBORO CO., Foxboro, Mass., recently brought out its Model 30 Stabilog Controller for applications where process lag is considerable. This instrument involves a new development called the "Hyper-Reset." The purpose of this is to reduce the effect of a process dis-



Control instrument with Hyper-Reset

turbance by making initial temporary additional corrections, which are proportional to the rate of change of the measured value caused by the disturbance. The normal reset follows, establishing stabilization. The several

control functions carried out by the Hyper-Reset are simultaneously and automatically adjusted. No tuning-in is necessary. And no more than two process adjustments are required, proportional and Hyper-Reset.

Heavy Duty Caster

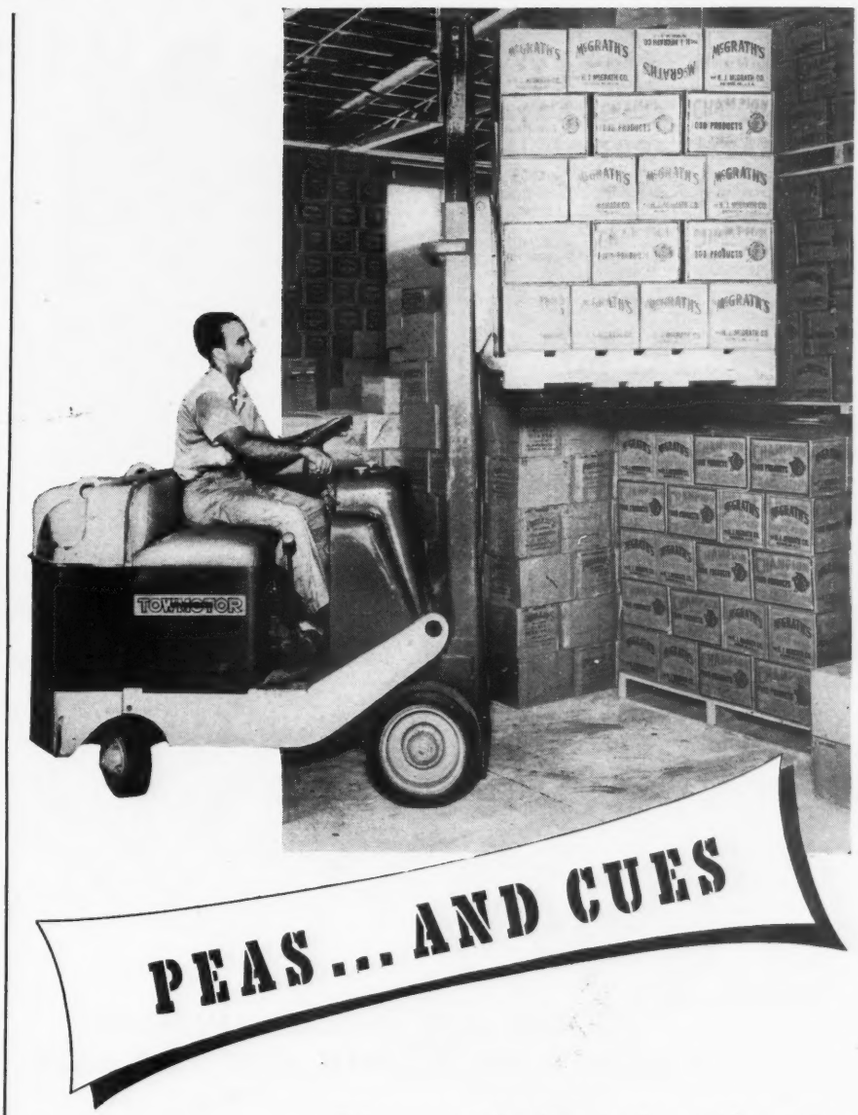
RAPIDS-STANDARDS CO., Grand Rapids, Mich., has brought out a new series of 8- and 10-in. casters for heavy duty service. In this caster, the top plate and swivel head are made of steel forgings, while the legs are designed of

Caster designed for heavy duty service.

heavy bar stock welded to the head. The shape of the fork made by the legs, and the method of its design, are said to be a new feature that more than doubles the strength and makes the product capable of withstanding heavy shocks and striking obstructions without impairing its efficiency or workability. This caster is equipped with ABK resinoid all-purpose wheels or can be furnished with Nicro-Steel wheels. Rubber tread wheels can also be furnished for applications having the approval of WPB.

Safety Cloth

COLLOID EQUIPMENT CO., INC., 50 Church St., New York City, is making "Ceco" safety cloth. This is a strong 10 mesh cotton cloth combined with a tough, transparent plastic film. It is put forward for use as either a permanent or emergency flexible window for buildings of any kind without the use of priority metals or materials. In addition, it can be used as a protection upon the inside of window glass to reduce the danger to persons or property from flying glass splinters. Another suggested use of this cloth is for making emergency repairs after windows have been broken. The cloth comes in 100-yd. rolls, 28 in. wide, totaling 702 sq. ft. of surface.



Take your cues for faster loading, quicker stacking, more usable space and more efficient manpower from the way Towmotor handles a heavy unit load of peas.

This "one man gang" picks up 1,000 to 10,000-pound loads in one operation . . . scoots them along narrow aisles as fast as 10 miles an hour . . . maneuvers in cramped quarters and builds stacks as high as 25 feet. That's Performance with a capital "P"!

There are 1001 production and warehousing applications for this mechanized time and money saver; there are problems you can lick with Towmotor. A new manual "The Inside Story" gives the facts. For a free copy write direct to Towmotor Company, 1222E East 152nd Street, Cleveland, Ohio.

TOWMOTOR

THE 24-HOUR ONE-MAN-GANG

A NEW H & D LITTLE PACKAGING LIBRARY BOOKLET IS READY

Yours for the Asking

EVERY MAN IN YOUR SHIPPING DEPARTMENT SHOULD READ THIS BOOK

Tells how to cut costs with practical, everyday working suggestions. Covers every phase of packing and shipping operations, from receipt of empty shipping boxes through loading packed boxes in freight car or truck.

Points out packaging short cuts. Shows how to cut time in storing, sealing, packing, stacking, loading corrugated shipping boxes. Suggestions are particularly valuable in packing war materials where time saving is vitally important.

Handy reference book. No matter what operation he performs, every man in your shipping department should read this book. He'll do a better job because of it.

Send for several copies. Be sure to ask for enough additional copies to supply all people interested. There is no obligation.

Write today. If you have a specific packaging problem, turn it over to the H & D Packaging Laboratory. There is no charge for Package Laboratory service.

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JUST OFF THE PRESS

BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Dust Recovery—"The Buell van Tongeren System of Industrial Dust Recovery" is the title of a 28-page illustrated bulletin describing this dust recovery system and its application in such industrial processes as the manufacture of powdered milk, dried yeast and grain products, published by Buell Engineering Co., 70 Pine St., New York.

Material Handling Equipment—The complete line of Ernst drum and barrel carriers for the manual handling of drums and barrels in industrial plants is discussed in a 6-page folder by Ernst Carrier Sales Co., 1456 Jefferson Ave., Buffalo, N. Y.

Spray Nozzles—Rex spray nozzles and their use in such applications as the cooling of fruit in packaging plants, the washing of raw food products, of floors and of equipment, are described in six-page folder No. 409, issued by Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis.

Sugar Equipment—Equipment for use in sugar factories, primarily that for material handling and for cane grinding, is described with specifications in 62-page illustrated catalog No. 766, issued by Jeffrey Manufacturing Co., Columbus, Ohio.

Water Stills—Automatic water stills for laboratory, industrial and other uses, steam, gas or electric heated, in capacities up to 250 gal. per hour, are described and illustrated in four-page Bulletin No. 907 issued by Precision Scientific Co., 1730 North Springfield Ave., Chicago.

PLANT SUPPLIES

Air Pipe Strainers—In a 6-page illustrated folder, a line of air filters for keeping dirt, moisture, rust, scale and other foreign matter out of compressed airlines is described by Filters, Inc., Glendale, Calif.

Belt Vulcanizers—In Catalog Section No. 2158, portable belt vulcanizers for splicing and repairing rubber conveyor and drive belts, are briefly described by B. F. Goodrich Co., Akron, Ohio.

Illumination Equipment — "Silv-A-King Makes Light Work for You" is the title of a 12-page illustrated catalog dealing with the application of reflecting light fixtures for incandescent and fluorescent lighting in industrial plants, issued by Bright Light Reflector Co., Metropolitan and Morgan Aves., Brooklyn, N. Y.

Lock Nuts—A wall chart, explaining the uses of various types of self-locking nuts is being distributed by Elastic Stop Nut Corporation, 2332 Vauxhall Road, Union, N. J.

Lubricant—"Hydrite," a lubricant consisting of a water suspension of colloidal natural graphite, is described in Bulletin No. 3A issued by National Graphite Co., Inc., 17 John St., New York.

Motor Care—A handbook entitled "A Guide to Wartime Care of Electric Motors," for use by plant engineers and maintenance men who care for electric motors, has been published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Motor Maintenance—The ABC's of preventive maintenance for electric motors have been condensed into four general maxims and are being distributed, printed on a blotter by Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland, Ohio.

Scales—Typical installations of floor scales, together with information on structural features of this equipment, are contained in a 4-page illustrated leaflet, Form 2410, published by Toledo Scale Co., Toledo, Ohio.

Speed Reducers—Two bulletins, designed to help in the solving of speed reducer problems, one entitled "Torque vs. Horsepower," and the other entitled "Overhung Loads on Speed Reducer Shafts" have been issued by Winfield H. Smith, Inc., Springville, N. Y.

Steam Pipe Strainers—A line of fine screen strainers for preventing rust, scale and dirt from clogging steam lines, in sizes from ½ to 2 in., is described in Bulletin S-200 issued by Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pa.

Steam Pumps—Steam-operated reciprocating pumps, horizontal, single-piston, Type AC, for pressures up to 250 lb. per sq. in., and capacities up to 219 gal. per min., are described in 4-page illustrated bulletin No. W-111-B31, published by Worthington Pump & Machinery Corporation, Harrison, N. J.

Water Pipe Strainers—For the protection of pumps by the use of strainers in the intake line, the line of "Ezy-Kleen" strainers is described on a two-page leaflet, Bulletin 400, issued by Blackmer Pump Co., Grand Rapids, Mich.

V-Belt Maintenance—"Facts on Wartime Care of Rubber V-Belts" is the title of a 16-page maintenance instruction bulletin for V-belt users, issued by Texrope Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

PACKAGING

Packaging—"How to Ship more Economically in Corrugated Shipping Boxes," is the title of a 20-page illustrated booklet, covering the storing, packing, sealing, stacking and loading of corrugated shipping containers, issued by Hinde & Dauch Paper Co., Sandusky, Ohio.

Shipping Containers—"Hints for Easy, Safe Sealing of Corrugated Shipping Boxes" is the title of a wall poster listing helpful hints for economical and efficient sealing of these containers, distributed by Hinde & Dauch Paper Co., Sandusky, Ohio.

Transparent Sheeting—A 24-page illustrated handbook of technical information on "Koroseal," an elastic material familiar to the food industries as a transparent sheet material for packaging, has been issued as Section 1, treating on general properties, by the B. F. Goodrich Co., Akron, Ohio.

Used Packaging Machinery—The offer to find a used wrapping machine to meet the inquirer's needs is contained in a recent 4-page folder issued by Package Machinery Company, Springfield, Mass.

CONTROL EQUIPMENT

Control Equipment—Kjeldahl equipment for the determination of nitrogen and protein content of such products as cereal foods, is described in 8-page illustrated bulletin No. 515, issued by Precision Scientific Co., 1750 N. Springfield Ave., Chicago.

Control Instruments—A 48-page illustrated catalog of the complete line of control instruments for temperature, flow, pressure, level and humidity, including combination instruments, valves, instrument panels and accessories, has been issued as Catalog No. 95-A by the Foxboro Co., Foxboro, Mass.

Electrical Instruments—Three-inch and four-inch sizes, round and square, alternating and direct current, panelboard instruments are described and listed with prices and specifications in Catalog 4120, published by Roller-Smith Co., Bethlehem, Pa.

Flowmeters—"Centrimax" flowmeters for measuring the flow of steam or water with high accuracy are described and illustrated in 20-page Catalog N-28-160 published by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.

pH Instruments—The Industrial pH Tester and the Cameron pH Meter are described in two recent publications of Wilkens-Anderson Co., 111 N. Canal St., Chicago.

How to Repair Valves
TO GET RENEWED LIFE FROM GATE AND GLOBE VALVES
TO CONSERVE CRITICAL METALS
NEW VALVES FOR OLD
PLEASE CHECK AND PASS ON
POST ON SHOP BULLETIN BOARD
AN AID TO VICTORY
What to Do in Repairing Leaky Gate Valves
How to Regrind or Renew Disc and Seat in Globe Valves
How to Renew Disc in Composition Disc Valves

A "BEST TELLER" FOR PIPING MEN

Look at the timely subjects covered in "Piping Pointers" Bulletin No. 5. What is more important to piping men—NOW—than knowing how to repair valves for better and longer service—to keep war production lines flowing—to conserve metals! We don't know of any other current source of such vital information.

"Piping Pointers" are designed to help you train men for the big maintenance job that faces industry at war. Their content is fully accurate and practical—it's based on Crane Co.'s vast experience as America's leading producer of valves and fittings. Even veteran workers use "Piping Pointers" to keep up-to-date.

FREE TO ANY PLANT

In "Piping Pointers," Crane shares its basic information with all industries producing for Victory. This service is *absolutely free,* yet countless plants have testified to its inestimable value in maintenance shops and employee training schools. If you're not using "Piping Pointers" now, let your Crane Representative arrange for your supply.

Five "Piping Pointers" Bulletins have been published to date. To meet the demand, extra supplies of all editions have been printed. Get the entire series now—*when you need them* most. *First come first served.*

CRANE

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836 SOUTH MICHIGAN AVENUE, CHICAGO

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

BOOKS

Dehydration Technics

OREGON'S FOOD DEHYDRATION PROGRAM. By Ernest H. Wiegand and F. E. Price. Published by the Agricultural Experiment Station, Oregon State College, Corvallis, Ore., 1942, as Circular of Information No. 274. 17 pages, mimeographed; 8½x11 in.; paper. Free.

While part of this circular is devoted to a study of Oregon's dehydrating potentialities, most of the information is good dehydration-process data usable by any dehydrator of fruits and vegetables. Such facts are given as percentage of water in various products, the amount of preparation waste, tray spread, drying time and drying ratio. Methods of preparing fruits and vegetables for dehydration are outlined, and a table lists the methods of preparation for various foods, the methods of pretreatment, maximum and minimum drying temperatures and humidities, drying times and final moisture content.

Safety Handbook

HANDBOOK OF INDUSTRIAL SAFETY STANDARDS. Published by National Conservation Bureau, 60 John St., New York, N. Y., 1942. 222 pages; 5½x7½ in.; paper. Price, 55 cents.

What with accident rates increasing in the food industries and with the additional wartime hazards of sabotage and air raids, the new edition of this book is of particular practical value to food plant managers.

The handbook will serve as a guide to management, foremen, supervisors and key employees in the detection and elimination of hazards and unsafe practices. And with its 32-page supplement on wartime protection of industrial plants, it is an authoritative source of information on how to prevent sabotage and minimize damage and production interruptions in case of air attack.

Preparation of Foods

FOOD MANUFACTURING. By Saul Blumenthal. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y., 1942. 664 pages; 6x9¼ pages, cloth. Price, $7.50.

Much general information about food products, ingredients and formulas is presented in this book. But in the strict sense of the term, "food manufacturing" is dealt with rather lightly. In fact, the book might more appropriately be titled "Formulas for Foods." Many commercial formulas from several sources are included in the book. And compatible with the formulas is a chapter on basic food ingredients, their properties and uses.

There is a chapter on methods and equipment, but it gives only brief descriptions or definitions of some of the processes and processing units. This chapter is followed by the one on basic ingredients, and then come chapters dealing with dairy products, confectionery, coffee and tea, desserts, sauces and condiments, pickles, fish, fried foods, health foods, nut products, bakery products, fruit sirups, beverages, fruits and vegetables, fruit juices, preserves and jellies. The book concludes with a chapter on the composition and caking of foods, acid and alkali foods, hydrogen ion control, analyses and tests. In the appendix are weights and measures, a chemical glossary, a bibliography and abbreviations.

1300 Tested Recipes

THE POCKET COOK BOOK. By Elizabeth Woody. Published by Pocketbooks, Inc., 1230 Sixth Ave., New York, N. Y., 1942. 494 pages; 4½x6½ in.; paper. Price, 25 cents.

Compiled with the assistance of *McCall's* food staff, this pocket-size cook book contains 1300 kitchen-tested recipes. As such, these recipes are not usable by food manufacturers, but they do offer suggestions for new products and a starting point in new-development research.

Wartime Food Problems

FOOD IN WARTIME. (A series of bulletins). Published by the University of California Press, Berkeley, Calif., 1942, 26 to 38 pages; 6x9¼ in.; paper. Price, 25 cents each.

Six bulletins, or pamphlets, have been issued to contribute statistical and economic information about the wartime food problems of this country. These publications are of particular interest to those in the industry concerned with the broad problems and policies of management and to those in government who are applying controls to food production and distribution.

The six bulletins are as follows: Control of Food Prices, by J. M. Tinley; Wartime Transportation and Distribution of Foods, by J. M. Tinley; Planning for Total Food Needs, by E. C. Voorhies; Rationing and Control of Food Supplies, by J. M. Tinley; Farm Problems in Meeting Food Needs, by R. L. Adams; and Adapting Fruit and Vegetable Products to War Needs, by W. V. Cruess, M. A. Joslyn and Gordon MacKinney.

The authors of all the publications except the last are agricultural economists. Two of the co-authors of the last one listed, W. V. Cruess and M. A. Joslyn, are food technologists.

Calcium Chloride Brine

REFRIGERATION DATA (with special reference to the use and properties of calcium chloride for refrigeration brine). Published by Calcium Chloride Association, 4145 Penobscot Bldg., Detroit, Mich., 1942. 71 pages; 6x9 in.; paper. Free.

Information on the requirements and maintenance of refrigeration brine, the use of corrosion inhibitors, the mechanics of refrigeration and the flow of brine in pipes are discussed. And there are charts and tables on the properties of calcium chloride; ammonia; size, displacement and refrigerating capacities of piping, pumps, tanks and ice cans; insulating materials; and the storage properties of foods.

Ultraviolet Analysis

ULTRA-VIOLET LIGHT AND ITS APPLICATIONS. By H. C. Dake and Jack DeMent. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y., 1942. 209 pages; 5½x8¾ in.; cloth. Price, $3.25.

Because ultraviolet light has some applications in food analysis, this book may be of practical value to food technologists and chemists. While most of the book is devoted to uses of ultraviolet outside of the food industries, there are chapters on its applications in microscopy, chemistry and spectroscopy. Chemical analyses of many types can be facilitated by the substitution of ultraviolet light for white light, and the authors give specific instructions for testing for the presence of several organic and inorganic substances.

Tea, Coffee Handbook

UKERS INTERNATIONAL TEA & COFFEE BUYERS' GUIDE. By William H. Ukers. Published by The Tea and Coffee Trade Journal Co., 79 Wall St., New York, N. Y. 1942. 244 pages; 5x7½ in.; paper. Price, $2.

Now in its eleventh edition, this work combines reference information on tea and coffee with directories of those engaged in the coffee, tea and spice businesses, and a list of equipment and supply houses. The reference pages include tea and coffee dictionaries and statistics on production and world trade. The directories include lists of coffee roasters, tea and coffee packers, grocery chains, green coffee merchants and brokers, tea and coffee exporters and spice grinders, importers and brokers.

A BOTTLE HAS A BRIGHTER FUTURE...

thanks to this woman's patient skill

INTRODUCING Mrs. Della Reed. Mrs. Reed polishes the cast iron molds in which Armstrong's Glass is blown. She rubs the inside surface of these molds with an oilstone until they shine like sterling silver and feel like velvet to the fingertips.

During her day's work, Mrs. Reed probably never sees a glass bottle. Yet thanks to her skill and patience, Armstrong's Glass has a smoother, brighter finish than ordinary glass.

It is possible to make glass bottles without stoning the molds as Mrs. Reed does. Her job would be regarded as unnecessary in many glass plant mold shops. But even if nobody ever noticed the extra brilliance of Armstrong's Glass, she'd still feel that her work was important. This is the attitude that everyone at Armstrong shares, from the men who run the glass machines to the women who pack the finished bottles into shipping cartons. It's the attitude that has made Armstrong's Glass the quality glass.

If you want the whole story of Armstrong's quality glassware, as well as Armstrong's complete line of closures, write for the new free booklet, "Men and Glass." Armstrong Cork Company, Glass and Closure Division, 910 Arch Street, Lancaster, Pennsylvania. Plants at Millville, New Jersey and Dunkirk, Indiana.

ARMSTRONG'S GLASS

and **ARMSTRONG'S CLOSURES**

PATENTS

Soya Oil Hydrogenated to Withstand Deep-fat Frying Temperatures—Arne Gudheim, Winchester, Mass., to Lever Bros. Co., Cambridge, Mass. No. 2,293,729. Aug. 25. 1942.

Finely Divided Particles of Coconut Meat Solids, Small Crystals of High-melting-point Fat, and Small Bubbles of Inert Gas Uniformly Dispersed in Coconut Oil and Fat to Give a Plastic Homogeneous Mass.—Thomas M. Rector, Morristown, N. J., to General Foods Corp., New York, N. Y. No. 2,293,848. Aug. 25, 1942.

Citrus Oil Obtained by Rolling Fruit Over Abrading Surface Submerged in Liquid and Subsequently Separating Oil From Liquid—William Carrington Platt, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,294,128. Aug. 25, 1942.

Beer Packaged in Metal Container With Rectangular Cross Section and With Scored Area in the Top Capable of Being Torn Loose and Formed Into Pouring Spout—Henry Gerhard, New York, N. Y. No. 2,294,292. Aug. 25, 1942.

Liquid Milk Cultured With Lactic Acid Bacteria Suspension and Homogenized Prior to Drying Without Destroying Lactic Bacteria Content—Ninni Maria Krongerb, Rydsgard, Sweden, to Svenska Mjolkprodukter, Aktiebolag, Stockholm, Sweden. Reissue No. 221,170. Sept. 1, 1942.

Salted Fish Freshened by Treatment With Water Solution Containing a Food Preservative Salt, a Carbonate, and a Small Quantity of Proteolytic Enzyme—Paul Stockhamer, London, England. No. 2,294,428. Sept. 1, 1942.

Fruits and Vegetables Dehydrated in Tray-equipped Compartmented Unit Through Which Temperature- and Humidity-conditioned Air Is Circulated—Benjamin Wiese, Chehalis, Wash. No. 2,294,530. Sept. 1, 1942.

Ground Roasted Peanuts Treated With Water Solution of Proteolytic Enzyme, Incubated at 95 to 100 Deg. F. for 24 hours and Consequently Heat Treated to 170 Deg. F. Preparatory to Making Peanut Butter—Williamson W. Moss, Jr., St. Petersburg, Fla. No. 2,294,682. Sept. 1, 1942.

Food Heat Treated Under Control of Periodically Operable Time-measuring and Time-regulating Mechanisms Functioning on Cycle of Operation—Robert Sardeson, Minneapolis, Minn., to Harold C. Genter, Miami Beach, Fla. No. 2,294,695. Sept. 1, 1942.

Bakery Products Cooled Under Mechanical Control While Moving Counter Current to the Movement of Conditioned Air—Frederic D. Pfening, Columbus, Ohio. No. 2,294,780. Sept. 1, 1942.

Endless Band in Biscuit Bake Oven Kept in Alignment Around Power-imparting Drums by Automatic Electrical Control Device—Harry O. Mercier, East Orange, N. J., to National Biscuit Co., New York, N. Y. No. 2,294,996. Sept. 8, 1942.

Mixture of Apple Pulp and Milk Evaporated Under Vaccum of 3 to 28 In. of Mercury at From 100 up to 208 Deg. F. to Form Nonsticky, Substantially Solid, Moldable Product—Frank C. Vibrandt, Robert D. Sieg and Thomas F. Farrar, Blacksburg, Va. No. 2,295,020. Sept. 8, 1942.

Yeast Grown in Vegetable-extract Medium to Give Predetermined Vitamin B_1 Potency—Henry J. Gorcica and Harold Levine, Milwaukee, Wis., to Pabst Brewing Co., Chicago, Ill. No. 2,295,036. Sept. 8, 1942.

Contents of Beverage Container Given Automatic Mechanical Mixing—James Kantor, to Liquid Carbonic Corp., Chicago, Ill. No. 2,295,114. Sept. 8, 1942.

Rice Cooked, Flaked, Dried to Desired Moisture Content and Explosively Puffed—John L. Kellogg, Jr., deceased, by Mary M. Kellogg, administratrix, Wilmette, Ill., to Helen L. Kellogg, Chicago, Ill. No. 2,295,-116. Sept. 8, 1942.

Mayonnaise and Similar Emulsions Made on Vertical Colloid Mill—William A. McLean, to Geneva Processes, Inc., Geneva, N. Y. No. 2,295,121. Sept. 8, 1942.

Vegetables Extracted With Stable Organic Solvent for Recovery of Vitamin K Concentrate—Byron Riegel and Perrin G. Smith, Evanston, Ill., Carl E. Schweitzer, Flint, Mich., and Vernon C. Free, North Chicago, Ill., to Abbott Laboratories, North Chicago, Ill. No. 2,295,129. Sept. 8, 1942.

Blackstrap Molasses Fermented for Production of Ethyl Alcohol in Two-step Process—Rafael Arroyo, Rio Piedras, P. R. No. 2,295,150. Sept. 8, 1942.

Pickles Graded for Size by Mechanical Means—Harry H. Zenge, Canton, Mo., and William J. C. Zenge, deceased, by W. E. Zenge, administrator, to Harry H. Zenge and F. W. Goetz, Canton, Mo. No. 2,295,-190. Sept. 8, 1942.

Pretzels Twisted by Mechanical Means—Millard F. Weida, to Curthalt Co., Canton, Ohio. No. 2,295,246. Sept. 8, 1942.

Honey Jelly Made by Heating Honey to Boiling Point, Adding Standardized Pectin and Small Quantity of Edible Acid and Further Concentrating by Boiling to Give Jellied Consistency Without Rubbery Characteristics—Joseph E. Walker, Saginaw, Mich. No. 2,295,274. Sept. 8, 1942.

Foods Cooked in Continuous Manner in Baskets Suspended From Endless Flexible Carrier While Moving Submerged Through Tank or Vat Containing Cooking Medium; Equipped With Mechanical Loading and Discharging Devices—George L. Gustafson, Danbury, Conn. No. 2,295,651. Sept. 15, 1942.

Noncondensible Gases Removed by Treating Hygroscopic Material With Superheated Steam During Drying—Charles J. Merriam, Winnetka, Ill., to Guardite Corp. No. 2,295,744. Sept. 15, 1942.

Bulk Drying of Hygroscopic Foods Carried on in Atmosphere of Superheated Steam at Subatmospheric Pressure to Establish Equilibrium of Vapor Pressure Between Steam and Product at Desired Moisture Content—Charles J. Merriam, Winnetka, Ill., to Guardite Corp. No. 2,295,745. Sept. 15, 1942.

Poultry Picked Free From Feathers by Mechanical Means—Roy H. Smith, Chatham Township, Morris County, N. J. No. 2,295,761. Sept. 15, 1942.

Canned Foods Brought to Desired Temperature Levels During Passage Through Horizontal Heat Exchanger on Endless Conveyor—Albert Horner, Kapaa, Kauaj, Territory of Hawaii. No. 2,295,846. Sept. 15, 1942.

Wheat and Other Grain Adjusted for Moisture Content Prior to Milling During Passage Through Tempering Process Countercurrent to Flow of Steam—Percy W. Thomas, Wichita, Kans. No. 2,295,918. Sept. 15, 1942.

Coffee Beans and Like Roasted or Heat Treated Under Thermostatically Controlled Time and Temperature Conditions—Raymond H. Vermillion, to Brinck Engineering Co., Inc., Los Angeles, Calif. No. 2,295,920. Sept. 15, 1942.

Milk Packaged in Frusto-pyramidal Container That is Mechanically Assembled Just Prior to Filling—Claude E. Pope, Oakland, Calif. No. 2,296,052. Sept. 15, 1942.

Bottled, Carbonated, Chocolate-flavored Beverage Given Prolonged Keeping Qualities by Addition of Sodium Benzoate Prior to Treating at Between 120 and 200 Deg. F.—Aaron D. Pashkow, Chicago, Ill. No. 2,-296,180. Sept. 15, 1942.

Flour Sifted Through Shaker Screen With Aid of Small Objects on Upper Surface of Screen Having Larger Size and Greater Density Than Flour Particles—Paul Naeher, Evanston, Ill., to B. F. Gump Co., Chicago, Ill. No. 2,296,293. Sept. 22, 1942.

Gas Supplied to Process Operations at Predetermined Rates and Pressures During Change From Solidified to Gaseous States—Franklin B. Hunt, to Liquid Carbonic Corp., Chicago, Ill. No. 2,296,349. Sept. 22, 1942.

Water Treated on Continuous Basis With Mechanical Means For Removal and Discharge of Sedimented Solid Wastes—Walter

"Tortoise Salt" vs "Hare Salt"

ONE OF OUR most difficult problems in selling Diamond Crystal Salt is the apathy of food technologists and salt buyers toward salt. Too often they say, "Oh, well, salt is salt."

Take solubility, for example. In salting butter, salt must dissolve with lightning speed. If the butter fat is on the soft side—lacking in body—as is likely at certain seasons, butter salt must dissolve so quickly that overworking is avoided. Otherwise, the butter may lose its desirable physical properties and become mottled or marbled—and it may lose its moisture, that is, become leaky. Yet, if the salt is not properly dissolved, the butter may be gritty. On the other hand, in salting cheese, slow solubility of salt is highly important. Otherwise, salt is lost in whey, producing undersalted cheese.

To meet these problems, we have set up definite solubility standards for Diamond Crystal Salt. Our Diamond Crystal Butter Salt, for example, dissolves completely in water at 65° F. in less than 9.8 seconds—average rate, 9.2 seconds. Quality-minded food processors can depend on Diamond Crystal products, manufactured under strict quality-control standards for solubility rate. That is why we have held our customers year after year.

If salt solubility enters into your processing, drop a line to our Director of Technical Service. He will be glad to recommend the correct grade and grain of Diamond Crystal Salt for best results in your plant. Diamond Crystal Salt Co., Inc., St. Clair, Michigan.

DIAMOND CRYSTAL
ALBERGER PROCESS SALT

H. Green, to Infilco, Inc., Chicago, Ill. No. 2,296,437. Sept. 22, 1942.

Edible Qualities of Infertile Eggs Maintained at Higher Than Room Temperature by Treatment With Carbon Dioxide in Airtight Container to Bring pH of Egg White Below 8.2—George Franklin Stewart to Iowa State College Research Foundation, Ames, Ia. No. 2,296,544. Sept. 22, 1942.

Sterol-containing Vegetable Oil Treated With Saponifying Agent Preparatory to Precipitation of Phosphatides and Extraction With Organic Solvent for Recovery of Sterols—Norman F. Kruse, Elmer B. Oberg and Wendell E. Mann, Decatur; Henry R. Kraybill, West Lafayette, and Kenneth E. Eldridge, Lafayette, Ind., one-half to Central Soya Co., Inc., Fort Wayne, Ind., and one-half to Purdue Research Foundation, West Lafayette, Ind. No. 2,296,794. Sept. 22, 1942.

Soybeans Sprouted For Food Use Under Thermostatically Controlled Conditions—Henry H. Hammerstrom, Los Angeles, and Ward B. Davis, Rosemead, Calif., to Secretary of Agriculture of the United States of America. No. 2,296,849. Sept. 29, 1942.

Oil-free Lecithin Dissolved in Alkyl Ether of Diethylene Glycol to be Given Water-dispersible Properties — Stroud Jordan, Brooklyn, N. Y. No. 2,296,933. Sept. 29, 1942.

Sliced Bread Loaf Packaged in Wrapper Constructed to Permit Reclosure of Each Section When Loaf is Broken in Half—Shy Rosen and Martin Rosen, Flushing, N. Y., to Milprint, Inc., Milwaukee, Wis. No. 2,296,951. Sept. 29, 1942.

Metal Containers for Foods and Beverages Sterilized Just Prior to Filling by Treatment With Solution of Acid That is Constituent of and Has pH Comparable to That of Intended Contents—George D. Beal, Pittsburgh, Pa., to Continental Can Co., Inc., New York, N. Y. No. 2,296,974. Sept. 29, 1942.

Shell Eggs Cleaned by Mechanical Means—Conrad J. Morgan, National City, Calif. No. 2,297,067. Sept. 29, 1942.

Ingredients of Bottled Beverages Mixed by Oscillating Movements of Mechanism Handling Bottle After Filling—James Kantor, to Liquid Carbonic Corp., Chicago, Ill. No. 2,297,154. Sept. 29, 1942.

Sterile Unoxidized Liquids Such as Orange and Grapefruit Juices Packaged in Reusable Storage Containers—Ronald B. McKinnis, Winter Haven, Fla. No. 2,297,190. Sept. 29, 1942.

Vitamin C Content of Liquids Preserved by the Addition of Stabilizing Agents Such as Thiourea and Methyl and Ethyl Derivatives of Thiourea—Heinrich Gockel, Hohen Neuendorf, near Berlin, Germany, held by Alien Property Custodian. No. 2,297,212. Sept. 29, 1942.

Ground and Crushed Orange Peel Used to Heighten Flavor of Citrus Fruit Juice Sirups—Gray Singleton, Fort Meade, Fla. No. 2,297,331. Sept. 29, 1942.

Temperatures of Heat-treated Liquids Held Substantially Constant for Predetermined Time—Clark F. Derleth, to Kusel Dairy Equipment Co., Watertown, Wis. No. 2,297,348. Sept. 29, 1942.

Fruits Surface-treated by Mechanical Device Fitted With Alternate Brushes Turning On Fixed Axes and Intervening Brushes on Vertical Moving Axes—Charles A. Willard, to Fruit Treating Corp., Orlando, Fla. No. 2,297,377. Sept. 29, 1942.

Shrimps Boiled in Salt Water Preliminary to Removal of Shells and Other Waste Matter—Wolfgang Henning, Lubeck, Germany, held by Alien Property Custodian. No. 2,297,411. Sept. 29, 1942.

Fish and Other Meats Preserved Fresh and Unfrozen by Treatment With Solution of Hydrogen Peroxide Preparatory to Packing in Ice Containing Hydrogen Peroxide—Rudolf Thilenius, Frankfort-on-Main, Germany, held by Alien Property Custodian. No. 2,297,441. Sept. 29, 1942.

Alkali Citrates Added to Dried Peas While Cooking to Speed Up Disintegration—Willi Rudolph, Karlsruhe, Baden, Germany, held by Alien Property Custodian. No. 2,297,502. Sept. 29, 1942.

Chewing Gum Base Made From Coagulated Latex Having Not to Exceed 50 Percent Water and Substantially No Chlorophyl—Carl E. Hatwig, Teaneck, N. J., and Boris N. Lougovoy, Jackson Heights, N. Y., to American Chicle Co., Long Island City, N. Y. No. 2,297,651. Sept. 29, 1942.

Whey Fermented by Acetone Butylalcohol Bacteria for Production of Vitamin B$_2$—Izue Yamasaki, Fukuoka, Japan, held by Alien Property Custodian. No. 2,291,671. Sept. 29, 1942.

Proteins of Oil-bearing Seeds Isolated and Recovered—John C. Brier and Gerard W. Mulder, Ann Arbor, Mich., to Welsh and Green, Inc., Chicago, Ill. No. 2,297,685. Oct. 6, 1942.

Uncooked Fondant Made From Sucrose and Anhydrous Beta-dextrose—Alfred L. Holven and William R. Junk, Crockett, Calif. No. 2,297,764. Oct. 6, 1942.

Canned Meat Subjected to Two-cycle Heat Treatment to Obtain Sterilization — Lloyd B. Jensen and Levi Scott Paddock, to Industrial Patents, Corp., Chicago, Ill. No. 2,297,962. Oct. 6, 1942.

Soya Protein Utilized in Making of Artificial Fibers—Oskar Huppert, Chicago, Ill., to Glidden Co., Cleveland, Ohio. No. 2,298,127. Oct. 6, 1942.

Fresh Meats Extracted With Salt Solution, Subjected to Pressure and Freezing to Give Low Fiber, High Protein Content Final Product—Carl G. Plitt, Sr., Carl G. Plitt, Jr., and Eugene A. Plitt, St. Louis, Mo. No. 2,298,159. Oct. 6, 1942.

Baking Powder Made to Contain Baking Carbonate and Aliphatic Organic Oxy-substituted Carboxylic Acid Amide as Constituents—John C. Woodhouse, Cragmere, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,298,187. Oct. 6, 1942.

NATURAL VITAMIN B COMPLEX

FOR THE FORTIFICATION OF FOOD

- LIQUID
- POWDER
- SYRUP
- HIGH POTENCY
- INEXPENSIVE
- WATER SOLUBLE

EXTRACTED FROM BREWERS' YEAST

FOR COMPLETE INFORMATION WRITE TO . . .

Vi-Co PRODUCTS CO.

415 WEST SCOTT ST., CHICAGO, ILL.

NOW—MOISTURE TESTS IN ONE MINUTE

On Dehydrated Vegetables, Meat, Eggs, and other products

The **STEINLITE** Electric Moisture Tester

Guaranteed Accurate

Easy to Operate

SPEED UP YOUR PRODUCTION AND SAVE MONEY

By means of the radio frequency impedance principle, the Steinlite makes a complete moisture test in ONE MINUTE. The sample is not heated, ground or damaged. It can be used to make tests on dehydrated vegetables, meat, eggs and the majority of ground or powdered products.

The Steinlite will give an immediate check on products in the course of manufacture and processing. It has a moisture range of 1 to 16% and is accurate to plus or minus .2 of 1%. Has proven its worth in the grain industry where over two thousand are in use. You cannot afford to overlook the possibilities of the Steinlite in your plant. Write for information about our FREE TRIAL OFFER.

SEEDBURO EQUIPMENT CO.

634 Brooks Bldg. Chicago, Ill.

Brief Summaries Of Grade Standards

(Continued from page 67)

containers fail in some respects to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug, and Cosmetic Act.

ISSUED: June 4, 1942
EFFECTIVE: July 1, 1942

Dried Apricots

DRIED APRICOTS are the halved, properly pitted fruit of the apricot tree, from which the greater portion of moisture has been removed. Before packing, the dried fruit is processed to cleanse the fruit and is sulphured sufficiently to retain a characteristic color. The finished product contains not more than 26 percent moisture by weight for No. 1 and No. 2 sizes, and not more than 25 percent moisture by weight for other sizes.

Inspection certificates shall indicate the size or combination of sizes found upon examination. The various sizes of dried apricots are as follows:

No. 1 (Extra Fancy Size)—1¼ in. or larger, in diameter.

No. 2 (Fancy Size)—1⅛ in. to 1¼ in. in diameter.

No. 3 (Extra Choice Size)—1 in. to 1⅛ in. in diameter.

No. 4 (Choice Size)—$\frac{13}{16}$ in. to 1 in. in diameter.

No. 5 (Standard Size)—less than $\frac{13}{16}$ in. in diameter.

U. S. GRADE A or U. S. FANCY dried apricots possess a practically uniform color in which the predominating color is characteristic of dried apricots when prepared from properly matured fruit. Not more than 7 percent by weight of the dried apricots may be damaged by discoloration, sunburn, hail marks, scab, disease, insect injury or other defects; not more than 2 percent by weight may be slabs; not more than 3 percent by weight may be immature; not more than 3 percent by weight may possess pits or pieces of pit or may be affected by mold, imbedded dirt, insect infestation, or other foreign material; and not more than 1 percent by weight may be affected by decay. The total of all defects mentioned herein, within the limits prescribed above, shall not exceed 10 percent by weight.

U. S. GRADE B or U. S. CHOICE dried apricots possess a generally uniform color in which the predominating color is characteristic of dried apricots when prepared from properly matured fruit. Not more than 10 percent by weight of the dried apricots may be damaged by discoloration, sunburn, hail marks, scab, disease, insect injury or other defects; not more than 3 percent by weight may be slabs; not more than 6 percent by weight may be immature; not more than 4 percent by weight may possess pits or pieces of pit or may be affected by mold, imbedded dirt, insect infestation or other foreign material; and not more than 1 percent by weight may be affected by decay. The total of all defects mentioned herein, within the limits prescribed above, shall not exceed 15 percent by weight.

U. S. GRADE C or U. S. STANDARD dried apricots possess a good color in which the predominating color is characteristic of dried apricots when prepared from properly matured fruit. Not more than 15 percent by weight of the dried apricots may be damaged by discoloration, sunburn, hail marks, scab, disease, insect injury or other defects; not more than 5 percent by weight may be slabs; not more than 10 percent by weight may be immature; not more than 5 percent by weight may possess pits or pieces of pit or may be affected by mold, imbedded dirt, insect infestation or other foreign material; and not more than 2 percent by weight may be affected by decay. The total of all defects mentioned herein, within the limits prescribed above, shall not exceed 20 percent.

OFF-GRADE dried apricots are dried apricots that fail to meet the requirements for U. S. GRADE C or U. S. STANDARD.

"Diameter" means the shortest measurement across the face of the apricot half when restored to its normal shape. "Properly matured" means apricots which, when harvested, have reached a state of development that will insure the proper completion of the ripening process. "Immature" means that the apricots are green or possess a color indicative of immature fruit. "Damage by discoloration" means that the apricots have become darkened to such an extent as to make them conspicuous when compared with other halves in the lot which meet color requirements.

Grist Mill Earns $2000 Annually with

TRADE FRICK MARK

That's the record of the Otterdale Mill, built in 1865 near Taneytown, Md. The 223 Knickerbocker steel lockers have proved so popular that several hundred more are now in demand.

Two Frick ammonia machines, driven by water power from Big Pipe Creek, provide extremely economical refrigeration.

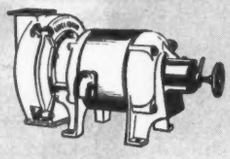
Many thousands of frozen food lockers are earning high returns for their owners in storages equipped with Frick Refrigeration. Let us give you the whole story: ask for Bulletin 145 on locker storages, and for the latest specification sheets on Knickerbocker lockers.

Frick Co., Waynesboro, Penn.

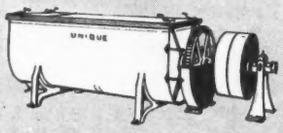
Refrigeration

UNIQUE

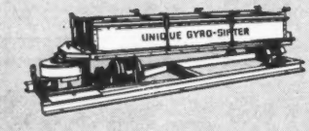
GRINDING



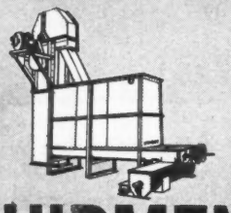
MIXING



SIFTING



HANDLING



EQUIPMENT

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"Damage by sunburn" means any substantial damage to color or texture of skin caused by excessive heat during the growth of the fruit. "Damage by hail marks, scab, or disease" means that the combined areas of all such defects, or of any one such defect, exceed the area of a circle ⅜ in. in diameter. "Damage by insect injury" means insect injury that penetrates the flesh or affects the appearance of the fruit. "Damage by other defects" means any injury or defect not mentioned herein which materially affects the appearance, edibility or keeping quality of the fruit. "Slabs" mean apricots that have been mashed, broken or mutilated to the extent that they have lost their contour and have become definitely flattened at the edges. "Insect Infestation" means the apricots are infested with live insects, insect remains, or excreta.

ISSUED: June 5, 1942
EFFECTIVE: July 1, 1942

Army Standards For Dehydrated Foods

(Continued from page 54)

Blanching

The potatoes should be blanched in live steam or in boiling water (usually not exceeding 10 minutes) until the pieces are translucent to the center and the peroxidase system has been destroyed. Excessive blanching shall be avoided. The blanched or precooked material should be dehydrated immediately. In no event shall it be held for more than one hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration shall be such that the product will not be scorched, case-hardened, or otherwise damaged. The finishing temperature shall not exceed 150 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will be ordinarily 1½ lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a uniform color, and a good, typical aroma, free from hay-like, scorched, musty or other objectionable odors. It should not contain more than 2 percent by weight of defective pieces. Regardless of the area of the defect, any piece shall be considered defective if it is discolored in whole or in part (scorched, bruised or decayed), or if it shows areas of peel, eyes or tray blackening.

Sliced white or Irish potatoes: Not more than 10 percent by weight of the product may pass through a standard sieve containing 2 meshes to the in. (0.446-in. opening) but not more than ½ of this amount may pass through a standard sieve containing 8 meshes to the inch (0.097-in. opening).

Diced or stripped (Julienne style) potatoes: Not more than 1 percent by weight of the product may pass through a standard sieve containing 8 meshes to the in. (0.097-in. opening). Not more than 10 percent by weight of Stripped (Julienne style) shall be less than 12/16 in. in length.

Shredded or riced, precooked potatoes may vary in length but shall not exceed ⅛ in. in diameter.

Powdered, precooked potatoes shall be free flowing and not more than 2 percent by weight of the product may fail to pass through a standard sieve containing 30 meshes to the in. (0.0232-in. opening).

Rehydration

Types I (sliced), II (diced) and III (stripped) shall rehydrate satisfactorily in water to approximately their original form and color within 30 minutes after coming to a boil. Types IV (shredded) and V (powdered) shall rehydrate satisfactorily within 10 minutes upon the addition of 4 to 6 parts by weight of boiling water to 1 part of dehydrated potato.

The rehydrated product shall possess a good, typical white potato color, and a good potato flavor. Upon rehydration, Types I, II and III shall possess a good potato texture and shall not be soggy or gummy. Types IV and V shall rehydrate to a smooth texture, practically free from lumps.

Rutabagas, Dehydrated

Dehydrated rutabagas shall be of the following types as may be specified in the invitation for bids: sliced, diced (cubed) or stripped (Julienne style), and shall be of the grade indicated herein.

The rutabagas used for dehydration shall be clean, sound, mature, of good cooking quality, and tender in texture when cooked. The dehydrated product shall be prepared under sanitary conditions and in accordance with the best commercial practice. Rutabagas of No. 1 grade (except for size) should be used.

Preparation

The rutabagas shall be thoroughly washed to remove soil and foreign material, and sorted to remove any rutabagas that are diseased or otherwise damaged. The sound stock shall be peeled, trimmed to remove the crowns or discolored portions, and either immersed in potable cold water or a clean two percent salt solution.

Type I (sliced) rutabagas shall be cut into slices, not less than 2/16 in. nor more than 4/16 in. in thickness; Type II (diced) rutabagas shall be cut into dice not less than $\frac{3}{16}$ in. nor more than 6/16 in. in width and thickness; Type III rutabagas shall be cut into strips (Julienne style) not less than $\frac{3}{16}$ in. nor more than 6/16 in. in width and thickness, and not less than 12/16 in. in length. If the cut pieces are to be held for more than 30 minutes they should be kept under running potable cold water or in a clean two percent salt solution. In no case shall the cut material be thus held for more than 1 hour prior to blanching.

Blanching

The cut rutabagas shall be blanched in live steam or boiling water (usually not exceeding 10 minutes) until the peroxidase system has been destroyed. Excessive blanching shall be avoided. The blanched mate-

rial should be dehydrated immediately. In no event shall it be held for more than 1 hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration should be such that the product will not be scorched, case hardened or otherwise damaged. The finishing temperature shall not exceed 160 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will be ordinarily 1½ lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a uniform color, and a good, typical aroma, free from hay-like, scorched, musty or other objectionable odors. The moisture content of the finished product shall not exceed 5 percent by weight. The dehydrated product shall not contain more than 2 percent by weight of defective pieces. Regardless of the area of the defect, any piece shall be considered defective if it is discolored in whole or in part (scorched, bruised or decayed), or if it shows areas of peel, crown or tray blackening.

Sliced rutabagas: Not more than 10 percent by weight of the product may pass through a standard sieve containing 2 meshes to the inch (0.446-in. opening) but not more than ¼ of the amount may pass through a standard sieve containing 8 meshes to the in. (0.097 in. opening).

Diced or Stripped (Julienne style) rutabagas: Not more than 1 percent by weight of the product may pass through a standard sieve containing 8 meshes to the inch (0.097-in. opening). Not more than 10 percent by weight of Stripped (Julienne style), shall be less than 12/16 in. in length.

Rehydration

Dehydrated rutabagas shall rehydrate satisfactorily in water to approximately their original form within 30 minutes after coming to a boil. The rehydrated product shall possess a good, typical rutabaga color, and a good rutabaga flavor and aroma. Upon rehydration, the product shall possess a good rutabaga texture, and shall not be soggy or woody.

Beets, Dehydrated

Dehydrated beets shall be of such of the following types as may be specified in the invitation for bids: sliced, diced (cubed) or stripped (Julienne style), and shall be of the grade indicated herein.

The beets used for dehydration shall be clean, sound, mature, of a dark red variety, of good cooking quality, of tender texture when cooked, and free from woodiness and light rings. The dehydrated product shall be prepared under sanitary conditions and in accordance with the best commercial practice. Beets of No. 1 grade, except for size, should be used.

Preparation, Blanching

The beets shall be topped, and thoroughly washed to remove soil and foreign material and sorted to remove any beets that are diseased or otherwise damaged. They shall then be blanched by exposing

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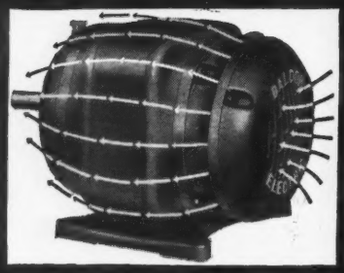

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them to flowing live steam for 25 or more minutes, or until the peroxidase system has been destroyed. The blanched beets shall be peeled and trimmed to remove discolored, damaged, or undesired portions. Type I (sliced) beets shall be cut into slices not less than 2/16 in. nor more than 4/16 in. in thickness; Type II (diced) beets shall be cut into dice not less than $\frac{3}{16}$ in. nor more than 6/16 in. in width and thickness; Type III (stripped) beets shall be cut into strips (Julienne style) not less than $\frac{3}{16}$ in. nor more than 6/16 in. in width and thickness, and not less than 12/16 in. in length. The cut material should be dehydrated immediately. In no event shall it be held for more than one hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration shall be such that the product will not be scorched, casehardened or otherwise damaged. The finishing temperature shall not exceed 150 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will be ordinarily 1½ lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a uniform dark red color and a good, typical aroma, free from hay-like, scorched, musty or other objectionable odors. The moisture content of the finished product shall not exceed 5 percent by weight. The dehydrated product shall not contain more than 2 percent by weight of defective pieces. Regardless of the area of the defect any piece shall be considered defective if it is discolored in whole or in part (scorched, oxidized, bruised or decayed) or if it shows areas of peel, insect damage or tray blackening. Not more than 1 percent by weight of the product may pass through a standard sieve containing 8 meshes to the inch (0.0937-in. opening).

Rehydration

Dehydrated beets shall rehydrate satisfactorily in water to approximately their original form within 30 minutes after coming to a boil. The rehydrated product shall possess a good red color, a good beet flavor, a reasonably tender texture and shall be free from woodiness.

Potatoes, Sweet, Dehydrated

Dehydrated sweet potatoes shall be of such of the following types as may be specified in the invitation for bids: sliced, diced (cubed), stripped (Julienne style), shredded or riced (precooked), or powdered (precooked), and shall be of the grade indicated herein.

The sweet potatoes used for dehydration shall be clean, sound, mature, of good cooking quality, mealy in texture when cooked, and those which discolor or become soggy after boiling shall not be used. The dehydrated product shall be prepared under the best sanitary conditions and in accordance with the best commercial practice. Sweet potatoes of the No. 2 grade or better (except for size) should be used. Sweet potatoes shall be of the moist (yam) type.

Preparation

The sweet potatoes shall be thoroughly washed to remove soil and foreign material and sorted to remove any potatoes that are diseased or otherwise damaged. The sound stock shall be peeled by any suitable means, trimmed to remove the discolored portions, and either immersed in potable cold water or a clean 2 percent salt solution to prevent darkening.

Type I (sliced) sweet potatoes shall be cut into slices not less than 2/16 in. nor more than 4/16 in. in thickness; Type II (diced) sweet potatoes shall be cut into dice not less than 3/16 in. nor more than 6/16 in. in widtli and thickness; Type III (stripped) sweet potatoes shall be cut into strips (Julienne style) not less than $\frac{3}{16}$ in. nor more than 6/16 in. in width and thickness, and not less than 12/16 in. in length. If the cut pieces are to be held for more than 30 minutes, they should be kept under running potable cold water or in a clean two percent salt solution. In no case shall the cut material be thus held for more than one hour prior to blanching.

Blanching

The cut sweet potatoes shall be blanched in live steam or in boiling water (usually not exceeding 8 minutes) until the peroxidase system has been destroyed. Excessive blanching shall be avoided, as over-blanching impairs the quality of the finished product. The blanched or precooked material should be dehydrated immediately. In no event shall it be held for more than one hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration shall be such that the product will not be scorched, casehardened, or otherwise damaged. The finishing temperature shall not exceed 165 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will be ordinarily 1½ lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a uniform color and a good, typical aroma, free from hay-like, scorched, musty or other objectionable odors. The moisture content of the finished product shall not exceed 7 percent by weight. The dehydrated product shall not contain more than 2 percent by weight of defective pieces. Regardless of the area of the defect any piece shall be considered defective if it is discolored in whole or in part (scorched, bruised or decayed, or if it shows areas of peel or tray blackening.

Sliced sweet potatoes: Not more than 10 percent by weight of the product may pass through a standard sieve containing 2 meshes to the inch (0.446-in. opening) but not more than ⅓ of this amount may pass through a standard sieve containing 8 meshes to the inch (0.097-in. opening).

Diced or stripped (Julienne style) potatoes: Not more than 1 percent by weight of the product may pass through a standard sieve containing 8 meshes to the inch (0.097-in. opening). Not more than 10 percent by weight of Type III, stripped (Julienne style) shall be less than 12/16 in. in length.

Shredded or riced, precooked potatoes may vary in length but shall not exceed ⅛ in. in diameter.

Powdered, precooked potatoes shall be free flowing and not more than 2 percent by weight of the product may fail to pass through a standard sieve containing 30 meshes to the inch (0.0232-in. opening).

Rehydration

Types I (sliced), II (diced) and III (stripped) shall rehydrate satisfactorily in water to approximately their original form and color within 30 minutes after coming to a boil. Types IV (shredded) and V (powdered) shall rehydrate within 10 minutes upon the addition of 3 to 5 parts by weight of boiling water to 1 part of dehydrated sweet potato.

The rehydrated product shall possess a good, typical sweet potato color, and a good sweet potato flavor. Upon rehydration Types I, II and III shall possess a good sweet potato texture and shall not be soggy nor gummy. Types IV and V shall rehydrate to a smooth texture practically free from lumps.

Tunnel Dehydraters and Their Use with Vegetables

(Continued from page 50)

ican Institute of Chemical Engineers, vol. 38, 91–121, 1942.
4. Moses, Dehydration of Prunes, Rural Electric Conference, University of California (Davis), 1942. (Mimeographed.)
5. Sherwood, Drying, Perry's "Chemical Engineer's Handbook," 1st Edition, pp. 1220–59; 2nd Edition, pp. 1480–1522.
6. Sherwood, The Air Drying of Solids, *Transactions American Institute of Chemical Engineers*, vol. 32, 150–68, 1936.
7. Sherwood and Comings, The Mechanism of Drying of Clays, *Transactions American Institute of Chemical Engineers*, vol. 28, 118–40, 1932.
8. Walker, Lewis, McAdams and Gilliland, "Principles of Chemical Engineering," pp. 613–84, 1937.

Conversion Will Keep Your Plant Operating

(Continued from page 43)

parts are now being made. This company went out and found its own orders but had trouble getting machinery. The Conversion Section was called in to help and everything was soon straightened out.

Following its own admonitions to prepare for future developments, the Conversion Section is investigating the chemical field to see if there is some product that a food plant could handle. Sugar refineries would be likely prospects for the chemical field, since it seems probable that some of the refineries will be closed and the operations concentrated in a few plants.

Eliminate your manual handling and rehandling with American MonoRail Overhead Handling Equipment. Hundreds of food manufacturers are now turning out more . . . faster with this equipment.

An American MonoRail engineer will gladly show the possibilities in eliminating production delays, decreasing handling costs and many other items that add up to more food . . . faster. American MonoRail Equipment is available for manual, automatic or electric operation. There is no interruption during installation. Send today for the American MonoRail Engineer.

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Shortages of other imported items such as coffee, chocolate, tea and spices are bound to cause difficulties for the firms handling these items. Even mayonnaise manufacturers are in for trouble, in spite of this year's record oil seed crop. The changing conditions brought about by the ebb and flow of the war may put any manufacturer in jeopardy and only good judgment and foresight can prevent trouble.

Another service performed by the Conversion Section is to help food manufacturers contact the right people in connection with government contracts. They have one man on the staff who does nothing else. But here again the service is in an advisory capacity. Nothing can be followed up by the Section.

Salesmanship Required

The food manufacturer must do the actual selling with his own force. Unfortunately, many have failed to grasp the fact that selling to the Army, Navy or for Lease-Lend requires the same sales tactics that would be used in selling customers in the normal channels of trade. In times of peace, the salesman would call every day for three months in order to land the business if the amount were sufficient. Certainly purchases by the various branches of government are great enough to warrant a thorough cultivation of that market, and there can be no excuse for giving up if an order is not secured after making one or two calls. Many manufacturers seem to overlook the number of individuals that should be sold in even one government purchasing organization. The Agricultural Marketing Administration has many purchasing agents. While they will tell you that personal contact means nothing if your price is right for products meeting the specifications and that they do not want to have their offices cluttered up with salesmen, it would be folly to overlook the importance of personal contact.

But the most important thing is to anticipate trouble before it strikes and have some sort of a plan ready.

Food Topics Highlight Chemical Show

(*Continued from page 46*)

The Ohio Chemical & Mfg. Co.,
1177 Marquette St., N. E., Cleveland, Ohio.

Omega Machine Co.,
3409 E. 18th St., Kansas City, Mo.

Leonard Peterson Co.,
1222 Fullerton Ave., Chicago, Ill.

The Pfaudler Co.,
89 East Ave., Rochester, N. Y.

Exhibit emphasizing the advantages of glass-lined steel equipment for processing corrosive materials.

Podbielniak Centrifugal Super-Contactor Co.
8312 South Chicago Ave., Chicago, Ill.

Standardized models of precise fractionation analysis apparatus for both low temperature and high temperature analyses.

Proctor & Schwartz, Inc.,
7th St. & Tabor Road, Philadelphia, Pa.

Dryers for foods and other materials, also food dehydraters shown in photographs, and samples of dehydrated foods.

Pulverizing Machinery Co.,
Chatham Road, Summit, N. J.

"Mikro" pulverizers of the latest designs, including a unit for laboratory or pilot plant purposes and a small production-size unit.

Raymond Pulverizer Div., Combustion Engineering Co., Inc.,
1315 No. Branch St., Chicago, Ill.

A laboratory pulverizer, a 10-in. laboratory mechanical air separator and an 8-in. screen mill, representing the larger machines, up to 40 tons per hour capacity, made by this company.

Ross & Rowe, Inc.,
75 Varick St., New York, N. Y.

Soybean lecithin products of various grades for use as antioxidants and for their surface-active properties, in the manufacture of food products, pharmaceuticals, cosmetics and many other products.

Sarco Co., Inc.,
475 Fifth Ave., New York, N. Y.

A complete line of steam traps, temperature regulators and pipeline strainers for use in food plants and other process industries.

E. H. Sargent & Co.,
155 E. Superior St., Chicago, Ill.

Laboratory equipment and supplies, with emphasis on high-speed electrolytic analysis, including the Heyrovsky Polarograph, for rapid analysis, product grading, measurements and research.

Schaar & Co.,
745 W. Lexington St., Chicago, Ill.

Laboratory equipment, featuring the Lumentron Photoelectric Colorimeter and the Brabender Moisture Tester for food and vitamin testing.

Claude P. Schneible Co.,
3951 W. Lawrence St., Chicago, Ill.

A working model of a dust collector in a glass case, to demonstrate dust-collecting methods widely used in food plants for eliminating dust or recovering materials in air exhausted from dryers or other process equipment.

The Selas Co.,
Erie Ave. and D St., Philadelphia, Pa.

The Sharples Corp.,
23rd and Westmoreland Sts., Philadelphia, Pa.

Cross-sectional drawings and plans of various centrifuges.

E. H. Sheldon Co.,
Muskegon, Mich.

Display of laboratory furniture including wall table, fume hoods, acid-resisting table tops and accessory materials.

Sivyer Steel Casting Co.,
1675 So. 43rd St., Milwaukee, Wis.

Sparkler Mfg. Co.,
Mundelein, Ill.

Featuring the reclamation by filtering of valuable edible and other oil products, showing a horizontal plate filter with glass walls and a stainless steel production-size filter.

D. R. Sperry & Co.,
Batavia, Ill.

Filter presses.

The Titanium Alloy Mfg. Co.,
Niagara Falls, N. Y.

Titanium, zirconium, ferro alloys of titanium and examples of products and materials in which these are used.

The U. S. Stoneware Co.,
60 E. 42nd St., New York, N. Y.

Chemical stoneware storage tanks, pipe, fittings, valves, and processing equipment; also concrete and wooden tanks lined with corrosion-resisting materials; corrosion-resistant paints; also products that are suitable alternates for scarce metals in processing equipment.

Victor Chemical Works,
Board of Trade Bldg., Chicago, Ill.

Walker-Wallace, Inc.,
14 W. Utica St., Buffalo, N. Y.

A.P.V. plate heat exchangers as used for cooking and heating in food plants and other process industries.

Wallace & Tiernan Co., Inc.,
Newark, N. J.

Wheelco Instrument Co.,
845 Harrison St., Chicago, Ill.

Control instruments, flame controls, level controls and temperature recorders operating on the electronic principle.

Wilkens-Anderson Co.,
111 No. Canal St., Chicago, Ill.

Laboratory instruments, stressing food products testing and control, including the Bendix Electro Deplater, the Coleman Electronic Photofluorometer and Spectrophotometer for vitamin determinations, and electrolytic apparatus for the deposition method.

Wilson Chemical Feeders, Inc.,
Buffalo, N. Y.

Automatic and manual control "Pulsafeeders" for chemicals, including a model that can be sterilized after use.

York Ice Machinery Corp.,
York, Pa.

Refrigerating equipment.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

BAKING

Stability of Vitamin B_1

VITAMIN B_1 losses in normal baking practice must be understood, so that enriched bread will meet whatever standards or claims are made for it.

In this study breads made with whole wheat flour, white flour enriched with high-vitamin yeast, and white flour enriched with synthetic thiamin yeast, all showed about the same loss of thiamin when baked at the same temperature for the same length of time.

In laboratory-baked loaves a progressive loss of thiamin was observed as the time of baking was increased. At 10 minutes, the loss was within the experimental error, at 20 minutes it was 13 to 17 percent, and at 30 minutes the loss was 21 to 23 percent. The bakings were all made at the same oven temperature. Comparison with commercial bakings showed that the loss in normal baking is approximately the same as that in the 30-minute laboratory loaves.

Analyses of crust and crumb fractions indicated that the major part of the thiamin loss occurs in the crust. For example, when time of baking in the laboratory loaves was extended to 40 minutes, the crust had lost 50 percent while the crumb had lost only 17 percent of its thiamin.

The determination of thiamin was made by the yeast-fermentation method previously reported by the authors, and included the sulphite modification. The latter is important, as part of the thiamin is split as it is inactivated.

Digest from "The Stability of Vitamin B_1 in the Manufacture of Bread," by A. S. Schultz, L. Atkin and C. N. Frey, *Cereal Chemistry*, vol. 19, 532-38, 1942.

Dextrins

DEXTRINS are starch decomposition products in the flour starch which are converted into fermentable sugars and carbon dioxide gas by amylases. While the dough fermentation depends upon the rate of conversion, the amount of dextrins present influences the character of the crumb in the finished bread.

Commercial dextrins are made from corn starch hydrolyzed by small quantities of mineral acids. By varying the heating time or the acid, or both, it is possible to get a number of different mixtures of dextrins, containing a varying percentage of soluble material. In an attempt to correlate solubility as a measure of dextrinization with fermentability of commercial corn dextrins, it was found that the reducing power in dextrins is not necessarily a measure of either dextrinization or fermentability.

Digest from "Dextrins: The Relation of Fermentability to Solubility and Reducing Power," by Elmer F. Glabe, *Cereal Chemistry*, vol. 19, 442-47, 1942.

CEREAL PRODUCTS

Starch in Crude Gluten

AN improved polarimetric method has been developed for evaluating the washing procedures used in separating wheat starch from gluten. The requirements of sharp differentiation between starch and protein, and improved starch dispersion technic, are satisfactorily met in the new method.

Starch in the crude gluten samples is dispersed by boiling 15 minutes in a calcium chloride solution containing a drop or two of *n*-octanol to prevent frothing. The dissolved proteins are precipitated with stannic chloride solution before filtering, then an aliquot is taken for the polarimeter. The result obtained by this rapid method is always low, but a constant correction factor can be applied which makes the polarimetric analysis accurate within 0.5 percent.

Diastatic and gravimetric starch determinations are slower and more complicated.

Digest from "Polarimetric Determination of Starch in Cereal Products," by K. A. Clendenning, *Canadian Journal of Research*, vol. 20C, 403, 1942 (Published in Canada).

Measuring Viscosity of Starch Pastes

VISCOSITY and flow properties of starch pastes are determined in the industrial control of starch products. The authors indicate that accurate control during preparation of the paste for test is more important than the method of measuring flow properties, in order to get strictly comparable test results. This holds for any of the commonly used instruments, including the fluidity funnel, the capillary viscometers such as the Ostwald pipette, and the rotational viscometers such as the MacMichael.

The paste must be allowed to attain equilibrium under the conditions chosen for test. Viscosities should be measured on hot pastes rather than on cold pastes, to avoid the variations in crystallizing tendency shown by different starches.

The apparent viscosity of a starch paste is influenced by its inherent composition, because the amylose fraction within the starch itself crystallizes easily, while the amylopectin fraction is resistant to crystallization. The proportion of these fractions varies with different starches. The apparent viscosity of the starch paste is also influenced by conditions which occur within the paste, such as aggregates of granules which surround portions of the liquid medium and behave as a unit, granules which have swollen sufficiently to become deformable under pressure and no longer act like rigid spheres, empty sacks of granules which have collapsed, and soluble material which has diffused out of the granules and changed the composition of the dispersing medium. No one mathematical expression could be expected to account for the response of each of these factors to changing pressure, temperature, time, concentration and the mechanical factors operating during preparation of the colloidal system.

Digest from "Interpretation of Viscosity Measurements on Starch Pastes," by B. Brimhall and R. M. Hixon, *Cereal Chemistry*, vol. 19, 425-41, 1942.

CONFECTIONERY

Gas Flame Control For Candy Testing

FOR use in cooking tests for candy manufacture, and wherever burner temperature must not fluctuate, a sensitive pressure reducer has been designed which accurately controls gas feed to burners. This manostat has held gas feed pressure at 49.6 mm. with a variation of only 0.5 mm. above or below the desired pressure, while the service pressure fluctuated between 104 and 164 mm., with as many as 6 sharp changes per minute. In these tests three small burners were used, burning a total of about 8 cu. ft. of gas per hour.

In testing candy without the flow manostat, the observed variations in cooking interval often were as much as 10 percent above or below the aver-

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60 WALKER ST., NEW YORK CITY

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A SAVING AT
EVERY TURN

age on check tests, and there was seldom less than a 5 percent spread above and below the average. With the flow manostat the individual values were generally within 1 percent of the average, for check tests, even when these tests were not consecutive and not all made on the same day.

The instrument, being a pressure reducer, can be used only at gas feed pressures below the minimum occurring in the service line.

Digest from "Flow Manostat for Various Purposes, Including the Candy Test," by M. J. Proffitt, *Journal of Research of the National Bureau of Standards*, vol. 29, 143, 1942.

DAIRY PRODUCTS

Thermoduric Organisms

THERMODURIC organisms are those bacteria which will withstand the temperature of milk pasteurization, 140 to 145 deg. F. for 30 minutes or 160 to 161 deg. F. for 15 to 16 seconds, but will not grow at these temperatures. The term thermophilic, on the other hand, is used for those bacteria which grow only in the presence of heat. This type is found to a greater extent in milk held at the pasteurizing temperature for 30 minutes, while the thermoduric type is present in high-temperature, short-time pasteurized milk.

Thermoduric bacteria represent a contamination already in the milk before pasteurization, probably arising in the farm conditions, while the thermophilic contamination is chiefly due to conditions in the holder-type pasteurizer.

Methylene blue tests are not an accurate index of thermoduric bacteria, and it is necessary to use one of the incubation methods in testing a milk supply.

Digest from "Thermoduric Organisms in Relation to High-temperature Short-time Pasteurization," by F. W. Fabian, *Journal of Milk Technology*, vol. 5, 237-42, 1942.

Whey Products

WHEY is potentially important in wartime food conservation. In the absence of large-scale processing facilities it can be converted into products such as the Swiss, Roumanian, Italian and Norwegian types of whey cheese. Probably the Norwegian *mysost*, in particular, could be popularized by a suitable effort.

Dried and condensed whey contains all the whey solids except the fat, which is separately recovered for making whey butter. Condensed whey paste can be used to advantage in confectionery, and a light condensed whey might well be delivered fresh to restaurants every few days for use in soups. The insoluble protein left after recovering lactose has a high whipping capacity, and the mother liquor after lactose crystallization has high vitamin potency.

There is a flavor barrier to popular use of whey products since they have a pronounced salty taste. This flavor, however, can be modified by processing, or masked by adding other flavors.

Digest from "*Utilization of Whey*," by D. M. Smillie and J. Wright, *Food Manufacture*, vol. 17, 158-62, 1942 (Published in England).

FATS AND OILS

Antioxidants

ANTIOXIDANTS act differently in animal and in vegetable fats. In general, di- and polyphenolic inhibitors and "inhibitols" are effective with animal fats. Vegetable oils are stabilized by acid-type inhibitors such as tartaric, phosphoric and other acids. There are certain reinforcing effects also found with the acid-type inhibitors.

The present study deals with the polyphenols, which may act either as phenolic or acid inhibitors and should be effective both in animal and vegetable fats. It has been shown that the trihydric phenols, gallic acid and ethyl gallate are effective in both types of fats.

Digest from "The Antioxidant Properties of Gallic Acid and Allied Compounds," by C. Golumbic and H. A. Mattill, *Oil and Soap*, vol. 19, 144-5, 1942.

FISH

Fish Oil Treatment

DESTRUCTION and loss of vitamins in fish oils is prevented by treating the fish with oxygen-absorbing compounds. Treatment of the fresh-caught fish with a brine or dry salt, depending on the method of handling on the fishing vessel, is most beneficial, but it is also possible to improve the vitamin yield by treating the fish tissue before distillation with the oxygen absorbers. In addition to increased yield and vitamin potency, the treatment improves the flavor of the oil produced.

Suitable reagents include the reduced compounds of sulphur and of phosphorus, the low-valence metal salts and unsaturated organic materials, sulphites and bisulphites, phosphites, hypophosphites, hydrazine, hydroxylamine, ferrous, titanous, cerous and manganous salts, pyrogallic acid, hydroquinone and diphenylamine. When fish meal is to be used for purposes for which the presence of the oxygen absorbers is undesirable, volatile sulphites can be used.

The oxygen absorber can be present during the entire period between catching the fish and the final oil removal,

and should be present during the entire oil-processing operation. A sufficient quantity of the oxygen absorber must be used so that the oils and vitamins are kept in a completely deoxygenated condition.

Digest from U. S. Patent 2,289,780, issued July 14, 1942, to K. C. D. Hickman and assigned to Distillation Products, Inc., Rochester, N. Y.

Freshening Salted Fish

SALT fish can be freshened and made palatable by washing with a liquor containing a sulphite or bisulphite as a food preservative salt to prevent putrefaction during an extended washing period, a carbonate or bicarbonate, and a very small amount of a proteolytic enzyme which may be either pepsin or papain. An additional food preservative such as *p*-hydroxy benzoic acid may be used to prevent mold formation. The various reagents are used in approximately the proportions of 95 percent combined sulphite and carbonate, 5 percent mold-preventing salt, and 0.001 to 0.002 percent proteolytic enzyme. This mixture is conveniently made up in tablets to be added to the washing water.

The enzyme must be kept below 0.01 percent of the weight of the total ingredients, in order to keep it below a concentration which causes the fish flesh to fall apart.

It is claimed that fish freshened in this manner are fresh in appearance, taste and quality, with firm white flesh and desirable cooking characteristics.

Digest from U. S. Patent 2,294,428, issued September 1, 1942, to Paul Stockhamer of London, England.

VITAMINS

Vitamin Retention In Green Snap Beans

COMPARATIVE tests of vitamin retention in frozen, canned and dried young green snap beans, Bountiful variety, showed that vitamins B_1, B_2 and C were retained best by blanching in boiling water two minutes, then quick freezing. The tests showed that blanching is highly important for vitamin conservation.

Quick freezing was definitely superior to canning in retaining vitamin B_1 and C, but canned beans retain vitamin B_2 as well as the quick frozen ones. Dehydration almost completely destroyed vitamin C, but the loses of the vitamins B_1 and B_2 of the dried beans were small even after one year in storage. While canning caused only a moderate initial loss of vitamin B_1, there was a further loss of about 45 percent

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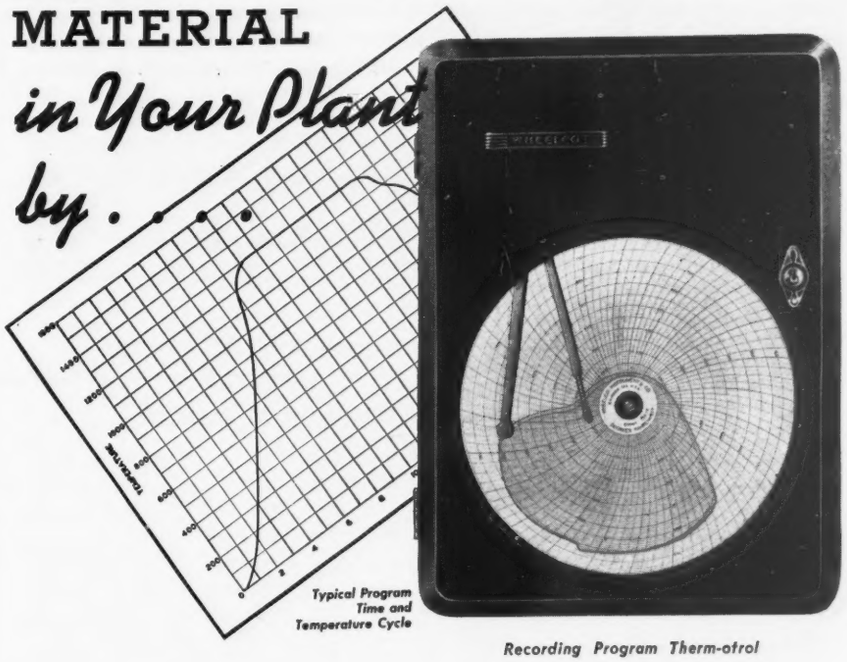

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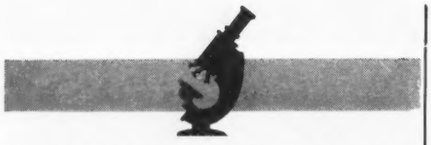

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after storage for one year. Of the three vitamins, only B_2 showed good stability to freezing, canning, drying and storage. Vitamin C, when it survived processing, was retained well in storage. In the canned products vitamin retention was equally good in the tin cans or glass jars.

Digest from "Vitamin Content of Green Snap Beans. Influence of Freezing, Canning, and Dehydration on the Content of Thiamin, Riboflavin and Ascorbic Acid," by K. T. Farrell and C. R. Fellers, *Food Research*, vol. 7 171–7, 1942.

MEATS

Smoked Wiltshire Bacon

In mild-cured bacon, smoking improved keeping quality, greatly increased the resistance of bacon fat to development of rancidity, reduced the surface bacterial count to 0.01 percent of the initial count, and improved the flavor. The initial color was lighter than in unsmoked bacon, but the smoked bacon soon darkened in storage. It is estimated that smoked bacon will keep about twice as long as unsmoked bacon.

Wiltshire bacon samples were cured in 30, 25 and 20 percent brines containing 0.22 to 1.07 percent sodium nitrate and 0.02 to 0.091 percent sodium nitrite. Other cures were made in a brine without nitrate and in a combination of strong pump pickle and weak cover pickle. The cured samples were smoked after various ripening periods and stored at approximately 15 deg. F. At intervals during storage they were compared with unsmoked samples. Not all attempts to achieve a mild cure were successful.

Digest from "Bacteriological, Physical and Chemical Measurements on Smoked and Unsmoked Bacon," by W. H. White, N. E. Gibbons, A. H. Woodcock and W. H. Cook, *Canadian Journal of Research*, vol. 20D, 264, 1942. (Published in Canada).

Chemical Changes In Tenderizing Beef

Chemical changes accompanying short-time aging of beef under ultraviolet radiation, holding about 48 hours at 60 deg. F., have been compared with those occurring during standard low-temperature aging for about 30 days. The accelerated aging gave a more rapid rise in sulphhydryl content, a more rapid increase in soluble nitrogen content, and a more rapid rise of the hematin-type pigments in the press juice. Vitamin C disappeared at about the same rate in both procedures, so that the vitamin content under the accelerated method was greater at the time of consumption.

Digest from "Chemical Changes Accompanying Tenderization of Beef," by J. F. McCarthy and C. G. King, *Food Research*, vol. 7, 295-9, 1942.

THOROUGH GREASE REMOVAL

Try the "smell and touch" test on a Metso-cleaned surface. The utensils and equipment washed with Metso are sweet-smelling, dry and grease-free, which avoids re-washing and often spoilage of contents.

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QUALITY CONTROL

Egg Powder Quality

Fluorescence testing has been successfully adapted to objective estimation of quality in dried egg powder. These tests agree with the results of organoleptic testing, and meet the further requirements for commercial application of rapidity and simple standardization.

Dried egg powder is defatted with chloroform, extracted with 10 percent potassium chloride solution, and filtered. Fluorescence is then measured with a Coleman photofluorometer, using the standard vitamin B_1 light filter which transmits light in the region of 3650 Angstrom units. The method can be standardized objectively with quinine sulphate.

Tests over a wide quality range showed close correlation with ratings given by flavor panels.

Digest from "Fluorescence as a Measurement of Quality in Dried Whole Egg Powder," by J. A. Pearce and M. W. Thistle, *Canadian Journal of Research*, vol. 20D, 276, 1942 (Published in Canada).

Get in Your Scrap! —Here's How to Do It

(Continued from page 55)

Once such equipment has been marked for scrap, a responsible shop man should supervise its dismantling and classification. The assortment may be made to yield valuable replacement parts for machines in operation. Cutting down the need for purchasing new parts will remove the plant from the competition for equipment.

No salvage campaign can be successful without the whole-hearted cooperation of every person in the plant. The battle for scrap to keep our production going is dramatic enough to put over with a bang. Stunts, posters, billboards and frequent mention in company publications are excellent vehicles for capturing and sustaining employees' interest in the program. In most cases, talent for this promotion can be recruited from among the employees.

Workers should be urged to contribute suggestions and ideas for increasing salvage output. Occasional rewards and incentives for outstanding cooperation in the salvage campaign will bring out employees' initiative. Workers can make or break a program.

Containers, displaying a slogan or poster, should be placed in strategic spots throughout yards and plants, to serve as depositing places for production scrap, salvaged waste materials and contributions which workers bring from their homes. Separate containers for different metals, rubber, twine, and so forth, will save time in sorting the material. Waste metal, rubber, burlap and other critical materials are valuable even in small amounts. Every pound of these materials can be salvaged by industry for war work.

Treat the factory to a house cleaning. What was junk six months ago has its place in the war effort now. Sort rubbish carefully. Salvage what can be used, and burn or otherwise destroy the real rubbish which cannot be salvaged. Keep the premises clear of debris. To get scrap back into production with the greatest possible speed, arrange regular daily or biweekly schedules for collection of scrap from various departments and sources of supply. The salvage manager should see to it that collections are turned in on time to a central collection depot in the plant. Select a definite date each week for shipment to a junk dealer or have the salvage shipped to the nearest collection point.

Just as important as salvaging vital materials is the need to conserve what you have. Use less by making better use of what you have. Get this message across to the workers. By preventing spoilage you can turn the material

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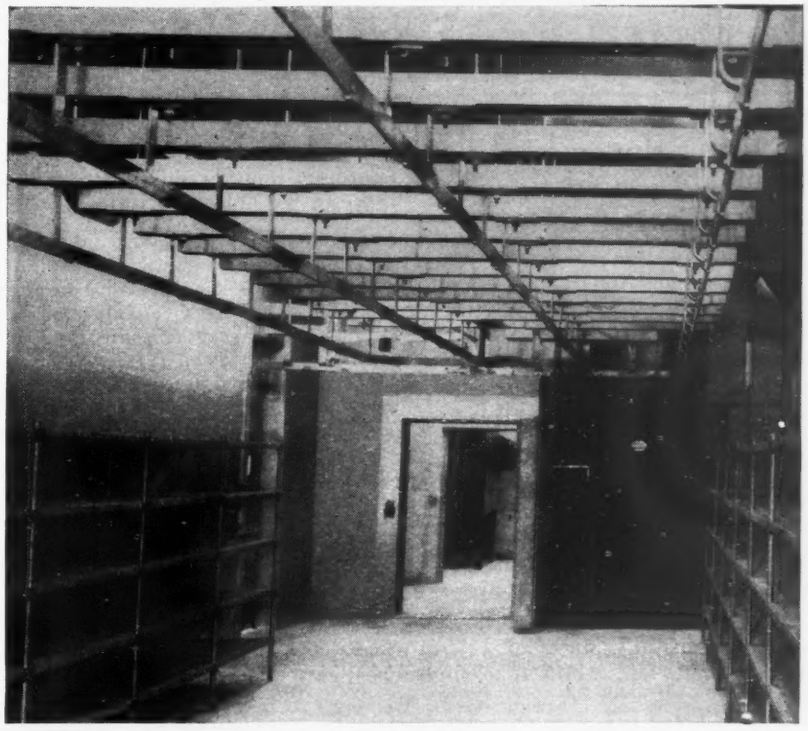

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It is essential that regular reports on the amounts collected, according to classification, be delivered to the Industrial Salvage Committee set up by the WPB in your community.

Above all, make clear to all personnel that until the day when we have actually turned out all the war equipment we need to smash the Axis, salvage and conservation will remain vital phases of our production.

Letters to the Editor

You Can't Hurt a Vitamin by Biting It

To the Editor
of FOOD INDUSTRIES:

There is something "astonishing" about your editorial in the September issue, but some will disagree that it is "Losses of Vitamin C." It has long been recognized that disintegration in the raw state of certain vitamin C rich foods causes them to rapidly lose their antiscorbutic value although this is not a major factor in the low antiscorbutic value of dehydrated foods. In lieu of emulating the Father of our Country and crossing the Delaware where I would be able to assemble references in scientific literature, I will quote myself from "Vitamins in Canned Foods,"[1] in reporting Bezssonoff,[2] who was attempting to determine whether the antiscorbutic value of the potato is in the juice or the pulp:

Potato—Equal to cabbage or dandelion as antiscorbutic for guinea pigs.

Potato marc—Amounts equal to original potato had little effect as antiscorbutic.

Potato juice—Less effective than equivalent of intact potato.

Potato marc and juice—Juice only slightly reinforced by marc, indicating a destructive effect due to the process.

According to your editorial, Dr. Fredcrick F. Tisdall is thankful to our Diety that it is otherwise with the tomato and the orange. To be fully logical he should have carried the matter further and berated man for not eating raw those vegetables, which, when disintegrated, will not lose their ascorbic acid, but will even reduce dehydroascorbic acid (oxidized ascorbic acid). We[3] (Kohman & Sanborn), found that the most violent aeration of green pea juice had little effect on its ascorbic acid and that it is capable of reducing large amounts of added dehydroascorbic acid. If, as you quote Dr. Tisdall, the mere act of chewing an apple or a potato in the raw state causes the destruction of half their vitamin C, then by all means, we should always chew a few green peas with them.

But is not this loss of vitamin C in chewing more bologna than astonishing? Borsook, Davenport, Jeffreys & Warner and others cited by them have shown that dehydroascobic acid fed to guinea pigs has the same antiscorbutic value as an equivalent amount of ascorbic acid. While dehydroascorbic acid is subject to further breakdown at the higher pH's, the pH of the gastric juice is favorable to its stability and the system is capable of reducing it. In fact the antiscorbutic value is due to this reversible oxidation and reduction.

Finally, since scurvy and sea voyages were so commonly associated, I quote from the most interestingly recorded of all sea voyages, Richard Henry Dana's "Two Years Before the Mast," 1929:

"Beside the natural desire to get home, we had another reason for urging the ship on. The scurvy had begun to show itself on board. One man had it so badly as to be disabled and off duty, and the English lad, Ben, was in a dreadful state, and was daily growing worse. His legs swelled and pained him so that he could not walk; his flesh lost its elasticity, so that if pressed in it would not return to its shape; and his gums swelled so that he could not open his mouth. His breath, too, became very offensive; he lost all strength and spirit; could eat nothing; grew worse every day; and, in fact, unless something was done for him, would be a dead man in a week, at the rate at which he was sinking."

After meeting the *Solon*, just from New York, in the tropical Atlantic:

"It was just dinner-time when we filed away, and the steward, taking a few bunches of onions for the cabin, gave the rest to us, with a bottle of vinegar. We carried them forward, stowed them away in the forecastle, refusing to have them cooked, and ate them raw, with our beef and bread. And a glorious treat they were. The freshness and crispness of the raw onion, with the earthy taste, give it a great relish to one who has been a long time on salt provisions. We were ravenous after them. It was like a scent of blood to a hound. We ate them at every meal, by the dozen, and filled our pockets with them, to eat in our watch on deck; and the bunches, rising in the form of a cone, from the largest at the bottom to the smallest, no larger than a strawberry, at the top, soon disappeared. The chief use, however, of the fresh provisions, was for the men with the scurvy. One of them was able to eat, and he soon brought himself to by gnawing on raw potatoes and onions; but the other, by this

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time, was hardly able to open his mouth, and the cook took the potatoes raw, pounded them in a mortar and gave him the juice to drink. This he swallowed, by the teaspoonful at a time, and rinsed it about his gums and throat. The strong earthy taste and smell of this extract of the raw potato at first produced a shuddering through his whole frame, and, after drinking it, an acute pain, which ran through all parts of his body; but knowing by this that it was taking strong hold, he persevered, drinking a spoonful every hour or so, and holding it a long time in his mouth, until, by the effect of this drink, and of his own restored hope (for he had nearly given up in despair) he became so well as to be able to move about, and open his mouth enough to eat the raw potatoes and onions pounded into a soft pulp. This course soon restored his appetite and strength, and in ten days after we spoke the *Solon*, so rapid was his recovery that, from lying helpless and almost hopeless in his berth, he was at the mast-head, furling a royal."

Perhaps even the guinea pigs will not be forced to swallow their carrots and their cabbage whole. While there may be a modicum of truth in Dr. Tisdall's statement, it certainly has no practical significance. I am convinced there is ample evidence to warrant the statement that man can live from birth to a ripe old age without ever partaking of a particle of raw food. But after the stress that nutritionists have placed on the importance of raw foods in the diet, publicizing the statement that eating certain foods raw results in loss of half their vitamin C will go a long way toward lowering the prestige of the science of nutrition.—E. F. KOHMAN, *Haddonfield, N. J.*

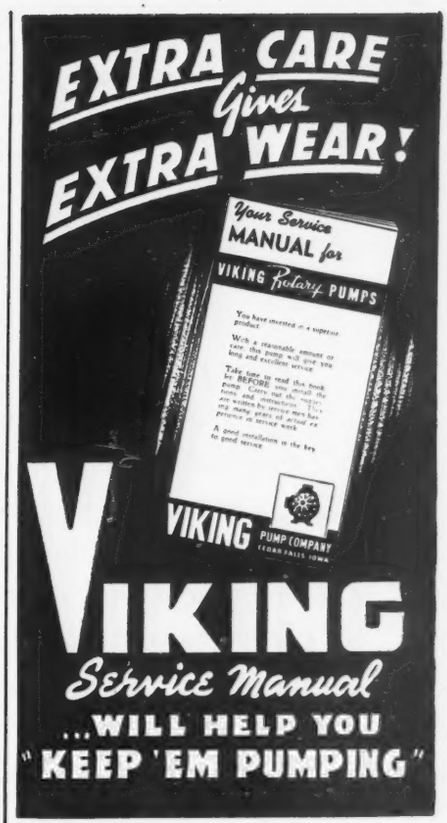
[1] *National Canners Association Bulletin* No. 19-L, May, 1922.
[2] *Comptes rendus*, vol. 172, 92, 1921, and *Bulletin of Social Hygiene*, vol. 8, 622, 1921.
[3] *Industrial and Engineering Chemistry*, vol. 29, 1195, 1937.

Re Chromate Inhibitors

To the Editor
of FOOD INDUSTRIES:

I have had the opportunity to read the article, "Watch Your Water Supply, It Affects Food Quality," by K. G. Weckel, published in January, 1942. On page 85 Mr. Weckel states: "Waters high in chlorides and sulphates or excessively chlorinated are likewise corrosive to tin plate. The use of chromate inhibitors is then desirable."

In the Proposed Revision, U. S. Treasury Department Drinking Water Standards, by J. K. Hoskins, *News Edition of American Chemical Society*, vol. 19, No. 20, Oct. 25, 1941, p. 1138, it is stated that even slight traces of hexavalent chromium should not be tolerated in a water supply.—M. E. GILWOOD, *Research Department, The Permutit Co.*



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The personnel of our Analytical Department is of the highest caliber and every effort has been made to make the most modern equipment available. Through thorough and careful analysis it has been possible for this department to make many suggestions which have resulted in improved products and improved methods of manufacture.

The research division of this department is constantly striving to improve or devise new techniques for the examination and analysis of our materials. New products, too, have always occasioned considerable analytical research, it often having been necessary to revise existing analytical methods to a great extent, or even to devise entirely new procedures. Needless to say, all of this would be impossible if analysis were considered to be merely a routine matter.

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FORMULAS FOR FOODS

FORMULA NO. 356

Orange Butter Cake Filling

Sugar	5 lb.
Corn sirup	1 lb. 12 oz.
Cornstarch	1¼ oz.
Salt	¼ oz.
Butter	2 lb. 8 oz.
Water	2 lb. 8 oz.
Egg yolk	1 lb. 14 oz.
Powdered orange juice	10 oz.
Powdered lemon juice	2½ oz.
Cold water	10 oz.

Directions

Place sugar, corn sirup, cornstarch, salt, butter and water into a copper kettle. When this is warm enough to melt the butter, add egg yolk, slightly beaten. Cook to 228 deg. F., stirring to prevent burning.

When this temperature is reached, have mixture of orange and lemon powder and the second portion of water ready in solution, and add. Recook to 212 deg. F., stirring to prevent burning.

Cool before using. Keep covered and cool.

Formula from The Borden Co.

FORMULA NO. 357

Ice Cream Novelties

Heavy cream*	25 lb.
Condensed skim milk	30 lb.
Granulated cane sugar	10 lb.
Corn sirup solids	8 lb.
Gelatine	0.3 lb.
Egg yolk powder	0.2 lb.
Water	26.5 lb.
Total	100 lb.

* Use 40 percent butter fat cream.

Directions

The size of the batch will depend upon the equipment available, such as the pasteurizer tank, homogenizer and storage tank.

Combine the gelatine and egg yolk powder with equal parts of granulated cane sugar by mixing them dry. Place the cream, condensed milk and water in the pasteurizer and heat to 120 deg. F. At this temperature add corn sirup solids, the rest of the granulated sugar and the prepared dry mixture of gelatine and egg-yolk powder. Pasteurize the complete ice cream mix by heating to 155 deg. F. holding at this temperature for 30 minutes before homogenization. Homogenize at about 2,500-lb. pressure, and cool to about 45 deg. F.

Keep the ice cream mix in a storage tank until ready to freeze.

For vanilla novelties, such as "pops," ice cream pies on sticks, "dixie" cups, and ice cream sandwiches, use vanilla extract at the rate of 1 oz. per gallon of ice cream mix. Other flavors, when used, should be incorporated according to the directions given on the labels of such flavors.

Formula from B. I. Masurovsky, consulting dairy chemist.

FORMULA NO. 358

Lentil Soup Cubes

Lentil flour, yellow	60 lb.
Sago flour	40 lb.
Potato flour	40 lb.
Onion powder	10 lb.
Celery seed powder	2 lb.
Salt	16 lb.
Sugar	5 lb.
White pepper	12 oz.
Beef extract	10 lb.

Directions

Place all ingredients, except beef extract, in an iron steam-jacketed kettle fitted with a stirrer. Heat and stir continuously.

Dissolve the beef extract in 5 lb. of boiling water and let it drip from an overhead container, into the mixture in the pan, continuing heating and stirring until dry.

Press into cubes and wrap.

Formula from H. B. Cronshaw, Surrey, England.

FORMULA NO. 359

Caravan Cake

Granulated sugar	2 lb. 4 oz.
Emulsifying-type shortening	1 lb. 2 oz.
Salt	1¼ oz.
Vanilla	½ oz.
Whole eggs	12 oz.
Dates, ground	2 lb. 4 oz.
Soda	1½ oz.
Hot water	2 lb. 2 oz.
Bread flour	2 lb. 10 oz.
Walnuts, chopped	1 lb. 2 oz.

Directions

Cream the sugar, shortening, salt and vanilla for 10 minutes on low speed, then add eggs gradually over a period of 5 minutes, creaming on medium speed. Mix dates and hot water together by hand, then add soda. This mixture should foam. Stir the date mixture, while warm, into the creamed mass, using low speed. Stir in the flour, on low speed, add nuts, and continue mixing for 3 minutes, still on low speed.

Scale 10 oz. for an 8-in. layer pan. Bake at 380 deg. F. for 30 minutes. Remove from pans while warm.

This may be used with a simple fruit or butterscotch filling.

Formula from Lever Bros. Co.

FORMULA NO. 360

White Frankfurters

Fresh veal or fresh beef	75 lb.
Fresh regular pork trimmings	75 lb.
Add per 100 lb. of meat:	
Nitrite*	⅛ oz.
Salt	3 lb.
Sugar	12 oz.

* While ⅛ oz. of nitrite is suggested above, it should be understood that this is to produce a white frankfurter. If a pink frankfurter is desired, the quantity of nitrite should be increased to ¼ oz.

Directions

Dissolve nitrite in one pint of water. Chop meat well with plenty of ice. Be sure dough is stiff. Place in box truck over night in cooler at 45 deg. F. Remove from chill room the following morning.

Place in chopper with 3 to 6 lb. of soya flour and add the following spices to every 100 lb. of mix:

White pepper	6 oz.
Mace	1½ oz.
Coriander	2 oz.
Cardimom	¾ oz.
Ginger	1 oz.

Where the flavor of honey or corn sirup is desired, the amount of sugar in the cure should be reduced to allow for replacement with a suitable quantity of whatever sweetening agent may be desired. This material can be stuffed in either natural or artificial casings.

Formula from Stein, Hall Mfg. Co.

FORMULA NO. 361

Peanut Crunch

Granulated sugar	25 lb.
Water—to dissolve sugar	
Corn sirup	10 lb.
Standardized invert sugar	5 lb.
Molasses, good flavor	10 lb.
Hardened edible oil*	3 lb.
Salt	8 oz.
Baking soda	2 oz.
Ground roasted peanuts	40 lb.

* Edible oil with 76-deg. F. melting point.

Directions

Cook the sugar, with sufficient water to dissolve it, the corn sirup, invert sugar, molasses, and edible oil, stirring

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constantly, to 300 deg. F. Add about 10 lb. of the ground roasted peanuts, which must be warm, and mix well. Then add the baking soda, mixing rapidly. Finally add the salt and the remainder of the ground warm nuts.

Spread the batch on an oiled slab and immediately roll into very thin sheets, using an oiled steel rolling pin. Or pass the batch through a standard caramel sizing machine with a corrugated lower roll or through drop rolls.

The crunchiness or eating character will depend upon the amount of ground peanuts added to the cooked batch.

Formula from The Nulomoline Co.

FORMULA NO. 362

Fruit Cookies

Brown sugar	4 lb.
Shortening	2 lb.
Eggs	8
Raisins	3 lb.
Currants	2 lb.
Walnuts	1½ lb.
Cinnamon	1 oz.
Mace	⅛ oz.
Salt	1 oz.
Soda	2½ oz.
Molasses	½ pt.
Malt	½ pt.
Water	1 pt.
Flour	4¾ lb.
Potato flour	1¼ lb.

Directions

Roll out, then cut into squares with a pastry cutter. Wash with egg wash before putting on baking sheets. Bake at 400 deg. F.

Formula from Rogers Bros. Food Products.

FORMULA NO. 363

Whipped Vanilla Fudge

Granulated sugar	60 lb.
Standardized invert sugar	10 lb.
Corn sirup	40 lb.
Hardened edible oil*	10 lb.
Sweetened condensed milk	40 lb.
Water	8 lb.
Basic fondant	35 lb.
Frappe No. 2	25 lb.
Salt	10 oz.

* 86 to 90 deg. F. melting point oil.

Directions

Place the sugar, invert sugar, corn sirup, edible oil, condensed milk and water in a kettle, mix well, and boil to 246 to 250 deg. F. (sea level). Turn off heat, add the basic fondant and salt, and mix well. Then add the frappe and flavor, mixing and stirring until the batch is fairly heavy. Spread out on waxed paper.

When the batch has partially set, work into the surface ground candied cherries, nuts, etc. Cut into squares or extrude from a rolled center machine and pack into paper cups, or wrap.

The basic fondant is made with:

Granulated sugar	28 lb.
Corn sirup	7 lb.
Standardized invert sugar	3½ lb.
Water—to dissolve the sugar.	

Boil all together to 245 deg. F., then cool and beat into fondant.

Frappe No. 2 contains:

Standardized invert sugar	12½ lb.
Corn sirup	12½ lb.
Albumen	½ lb.
Water, cold	1 lb.

Boil the corn sirup to approximately 245 deg. F. Turn off the heat, add the invert sugar and stir until it is melted. Place the batch in a marshmallow beater and start beating, then gradually add the albumen solution and beat until light.

Formula from The Nulomoline Co.

FORMULA NO. 364

Apple Cake

Brown sugar (sifted)	1 lb. 4 oz.
Fine granulated sugar	3 lb. 4 oz.
Emulsifying-type shortening	1 lb. 8 oz.
Mace	1/16 oz.
Cinnamon	⅛ oz.
Eggs (at 75 deg. F.)	10 oz.
Soda	2 oz.
Milk* (at 75 deg. F.)	2 lb.
High-grade cake flour	5 lb. 4 oz.
Baking powder	1 oz.
Apples (medium chopped)	6 lb.
Salt	1 lb.

* Amount of milk may be varied to give proper texture.

Mixing Directions

Cream the sugars, shortening and spices, on second speed, for about 2 minutes, then add the eggs and cream for about 3 minutes more, still on medium speed. Dissolve the soda in milk and add to the mixture, ½ minute on low speed. Add the cake flour and baking powder sifted together, continuing to mix for ½ minute.

The apples should be chopped with the salt, and added to the batter by mixing ½ minute on low speed. Use solid-pack apples, or drain well before using, and do not chop too fine.

Scale 14 oz. to an 8-in. deep layer pan. Sprinkle each unit with ½ oz. of cinnamon sugar and 1 oz. of buttered pecans before baking.

Cinnamon sugar is made by mixing 1 oz. of cinnamon with 4 oz. of fine granulated sugar. The buttered pecans are prepared by mixing 18 oz. of chopped pecans with 5 oz. of melted butter.

Bake at 350 to 360 deg. F. for 20 minutes. Remove from pans when almost cold.

Formula from Lever Bros. Co.